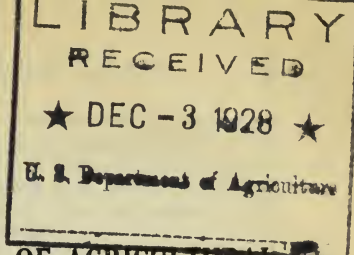


## Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



RELEASED,  
MONDAY, DEC. 3, A.M.



## REPORT OF THE CHIEF OF THE BUREAU OF AGRICULTURAL ECONOMICS

UNITED STATES DEPARTMENT OF AGRICULTURE,  
BUREAU OF AGRICULTURAL ECONOMICS,  
*Washington, D. C., September 17, 1928.*

SIR: I have the honor to transmit herewith a report of the work of the Bureau of Agricultural Economics for the fiscal year ended June 30, 1928.

Respectfully,

NILS A. OLSEN,  
*Chief of Bureau.*

Hon. W. M. JARDINE,  
*Secretary of Agriculture.*

The Bureau of Agricultural Economics was under the direction of Lloyd S. Tenny, as chief of the bureau, until he resigned on July 16, 1928.

During the past year the activities of the bureau have been strengthened along a number of important lines, in order to meet the increasing demand for economic information and services. Much effort has been devoted to furnishing information of assistance in remedying maladjustments in farm organization and agricultural production. Requests have been frequent for assistance in planning improved systems of agriculture in districts where changed conditions have made the old order unprofitable.

In an effort to bring about a better adjustment of production to market requirements, the agricultural outlook reports have been materially expanded and improved. The outlook report issued in February, 1928, summarized in brief form the situation with regard to each crop and pointed out the probable trends of supply, demand, and prices during the coming year. A number of State agencies cooperated with the bureau and published further detailed information showing the application of the outlook report to their particular States and localities. Supplementing the outlook reports, the "intentions to plant" reports are issued just previous to planting time,

both in the spring and fall, and the pig surveys, showing farmers' intentions to breed pigs, are issued twice a year. In addition, a pamphlet covering current developments in the agricultural situation is published once a month. Congress recognized the need for strengthening the outlook program and in the appropriation act for the fiscal year 1929, included a substantial increase with which it will be possible to organize the work much more effectively during the coming year.

The bureau has worked in close cooperation with farmers in putting such information to practical use. Farmers have been assisted in finding the most profitable combination of farm enterprises under varying conditions. Many sections have reorganized their farm activities on a more profitable basis as the result of recommendations made by this bureau. State and local agricultural workers have joined the bureau in this work.

The reinforcement of the commodity and general market information service has been no less marked. Although there has been no material expansion of resources for these activities, it has been possible through reorganization and coordination of the services to furnish a greatly increased volume of pertinent information on current economic conditions. Particularly significant has been the growing demand for

economic interpretations of available data. The bureau has striven to meet this demand through a wide range of research studies and through its current summaries and monthly market situation reports. It should be remembered that the volume of statistics covering farm commodities is so large, and the factors affecting future prospects and farm incomes are so numerous and complex, that thorough analyses of the data must be made by those skilled in interpreting such data if they are to be of practical use to producers.

The foreign service of the bureau is a vital factor in its program. Although supplied with only a limited number of outposts in foreign countries, the bureau, working in cooperation with other departments, has been able to provide with increasing success the kind of information which producers need in the marketing of their products abroad. The bureau's marketing specialists have given very practical assistance in explaining the standards for American farm products to foreign buyers and in advising American producers and shippers regarding the tone of foreign markets and the best methods of handling products to meet the requirements of foreign markets.

The cooperative marketing act, which has now been in operation for two full years, has made possible the development of a program which has been of vital importance to farmers' cooperative associations throughout the country. The bureau is now rendering expert assistance with regard to the many problems facing cooperatives, and advises groups of farmers with regard to the possibilities and limitations of the cooperative method of marketing and purchasing.

The service and regulatory activities of the bureau, such as the inspection of farm products, and the administration of the cotton futures and cotton standards acts, grain standards act, warehouse act, and the standard container act, have carried on full programs. The experimental beef grading and marking service has met with general approval and has now been put on a fee basis. A service covering certification as to point of origin of alfalfa seed has been inaugurated and has met with much favor.

New legislation which has been put into effect includes the act providing for the publication of statistics of the grade and staple length of cotton of the carry-over and of the current year's crop. Preliminary work on the

1927 crop in two sample areas was done under the regular appropriation act during the past year. This work was very successful and indicates that the full data which will be published for the August 1 carry-over and the 1928 crop will be of great benefit to the cotton interests. An act relating to the investigation of new uses of cotton was passed late in the year, as well as an act authorizing the use of certain funds for studies of the marketing of wool and for establishing wool standards. An act providing specifications for hampers, round-stave baskets, and splint baskets, which rounds out the program of standardization of containers for fruits and vegetables, was approved late in the year. The produce agency act was effective throughout the past year, but little activity was possible until the passage of the first deficiency act, which provided funds for its administration. Eighty complaints were investigated, and 62 had been settled at the close of the year.

A point of strength in the bureau's work is the wide cooperation which is maintained with State and local agricultural workers. This makes it possible for the Federal workers to come into closer touch with local conditions and to obtain facts at less cost than would otherwise be possible, and also to reach more easily the groups of farmers for whose benefit the studies are being made. Invaluable aid was given the bureau in gathering production and market information and in making these data available to the public. The local workers assist most effectively in helping farmers to put the recommendations for improvements into practical use. Work is carried on under cooperative agreements in every State in the Union and in Porto Rico.

Detailed reports follow, which cover the work under each of the major divisions of the bureau.

## DIVISION OF FARM MANAGEMENT AND COSTS

H. R. TOLLEY, *in charge*

The research work of the Division of Farm Management and Costs serves as a medium through which the bureau's various lines of economic information are focused upon the individual farmer's problem of what to produce and how to produce it so as to obtain the greatest profit. Information relating to market require-



ments, present and prospective demand and prices, production trends in competing regions, and production costs, methods, and practices are interpreted in the light of the conditions and factors governing successful farming in particular farming regions in such a way as to assist individual farmers and groups of farmers in determining sound production programs for their farms.

Partly as a result of the increasing commercialization of agriculture, the problem of regional competition between the farmers of different producing areas has taken on added significance in the past decade. For this reason a regional study of many farm-management problems centering around particular commodities or types of farming is necessary. The more recent work of this division includes a number of projects of this type; for example, the studies of the apple industry, of the effect of the European corn borer upon farm management in the infested areas, of the combine harvester-thresher in the Great Plains region, and of range-cattle production.

#### TYPES OF FARMING

Studies of types of farming in the United States have progressed to the point where type-of-farming areas have been definitely established for the three census years 1910, 1920, and 1925. Maps have been prepared for publication showing these areas and indicating the important shifts which have taken place in types of farming during the past 15 years. These maps are particularly helpful in showing the effect of the conditions during the war and postwar periods upon farming systems in various parts of the country. Special attention has been given to the changes in types of farming that have occurred in the Cotton Belt and the problems that have arisen in connection with these changes.

In cooperation with the State experiment stations detailed analyses of types of farming have been completed in Oklahoma, Michigan, and North Dakota. Particular attention was given to determining the tendencies with respect to changes in the prevailing types of farming in the different parts of the State. The results have furnished agricultural workers definite knowledge upon which to base programs for improvement. In North Dakota the data assembled were made the basis for a series of economic conferences which were largely attended

by farmers. After consideration of the facts presented to them definite programs looking toward the improvement of agriculture were outlined and adopted by the farmers and extension agencies. Similar detailed analyses of types of farming are now in progress in Texas, South Dakota, and Kansas.

#### FARM RECORDS AND ACCOUNTS

Studies of farm-organization and management problems by means of farm records and accounts were continued in cooperation with the State colleges of agriculture in selected farming areas in 16 States in which changing economic conditions are making adjustments necessary in the farming systems and practices.

In these studies data are obtained from carefully kept records, showing the amounts of man labor, horse work, and fertilizer and other materials used in growing the different crops, the man labor, horse work, feeds, and other materials used for the different kinds of livestock, and the prices paid by farmers for materials bought and received by farmers for the products sold in recent years. These data, together with other information, are used in outlining systems of farming that seem to offer opportunities for profits under present conditions. They also show how successful farmers have worked out profitable systems and practices.

Results have been published on studies in an irrigated section of Colorado, a dairy section of Wisconsin, a hill-land cotton section of Mississippi, a dairy, small-fruit, and tobacco section of Kentucky, a dairy section of Kansas, and a black-land cotton section of Texas.

#### REORGANIZATION OF FARMS

The introduction of more profitable farming systems on tobacco farms of south-central Virginia was continued in cooperation with the Virginia Polytechnic Institute. A number of farmers are now putting into practice recommendations which the department has made. In general, these farms have been reorganized so that tobacco plays a less important part in the farmers' incomes. Poultry, dairy, and hog enterprises have been expanded, and only the better tobacco fields have been planted in tobacco. More land is available for the production of feed crops, a situation which fits well with the livestock enterprises.

Studies were made, in cooperation with State agricultural experiment stations, of the systems of farming in western Montana, northwestern Indiana, the central San Joaquin Valley of California, the Salt River Valley of Arizona, and the Elephant Butte Irrigation Project in Texas and New Mexico. Analyses of production and marketing were made, and possible future returns were considered in making recommendations for changes in the present systems of farming. Farm plans were submitted to committees of farmers, and other means were taken to bring about practical results.

#### FARM BUDGETING

In Kentucky, North Carolina, and North Dakota, organized projects are under way in cooperation with the State colleges of agriculture in which definite farm plans are worked out with farmers who agree to put them into operation. These plans are the result of farm budgets for different systems carefully worked out and compared. These farmers keep accounts during the year, and the results obtained are compared with results that might have been obtained with other systems as shown by budget statements. In this way data are obtained which are used as a basis for modifying conclusions obtained by other research studies or for showing that these conclusions are sound and practicable. A bulletin on farm budgeting and forms to be used by farmers was published.

#### LOCAL APPLICATION OF OUTLOOK INFORMATION

Increasing attention is being given to the use of outlook information in determining the adjustments in farming plans which are necessary in order to obtain the greatest continuous profit. Special efforts have been directed toward cooperation with State and local agencies in localizing and interpreting the outlook reports issued by the bureau so that the information will be more directly applicable to the varying conditions which prevail in the different sections of the country. The outlook information was received with great interest by farmers and extension agents, and in many areas the holding of annual or semiannual outlook meetings where this information is presented and its significance discussed has become an established feature of agricultural extension work. Studies essential to providing farmers with more background information upon

which current interpretations of outlook information may be based were continued and expanded during the year. A moving picture setting forth the objectives and essential features of the outlook work was prepared in the bureau and has been well received.

#### COMBINE HARVESTER-THRESHER OPERATIONS

The studies of the use of the combined harvester-thresher in harvesting small grains were continued. Information was obtained in Illinois, Indiana, Pennsylvania, South Dakota, and Virginia in 1927 to supplement that which was obtained in the Great Plains in 1926.

In southwestern Kansas and northern Oklahoma a special study of the effect which the combine is having upon farm organization was made in cooperation with the experiment stations. This study revealed that because of the combine important changes are taking place in the size of the farm unit and in the relative importance of the various lines of production. Systems of farming which would utilize the combine and other resources of the farm most effectively were outlined for this area as a result of the study.

The results of these studies indicate that the advantages of the combine are the saving of labor, the eliminating of transient labor, the early clearing of fields for tillage operations, the distributing of the straw on the land, and the getting of the grain to market earlier. The disadvantages were found to be the large investment required, the large amount of power consumed, the greater risk from damp grain, the greater risk to crops from storms, and the difficulty of saving the straw for feed and bedding. Harvesting and threshing losses need be no greater with combines than with other methods of harvesting and usually are less. A discussion of these findings has been published and a motion-picture film prepared.

#### THE APPLE INDUSTRY

Studies of the apple industry were continued from last year. A bulletin covering the Indianapolis apple market was issued in cooperation with the Purdue Agricultural Experiment Station. The bulletin treats of the local and outside sources of the city's apple supply and the varietal requirements of the market. It points out the possibilities which local producers have of increasing production of specific varieties and the necessity of improving



the quality and pack of locally grown apples. A report was issued on the sources of apple supply and varietal composition of the supply of 41 important cities located in various parts of the country. Local and outside supplies were analyzed and special attention given to the outstanding reasons for the prevalence of specified varieties in each market. Studies of the prices received by growers for various varieties, grades, and sizes were continued. In cooperation with the Utah and Arkansas State Experiment Stations, special studies were made of profitable adjustments which might be made in the farming systems of the apple areas. A bulletin was issued on the factors affecting apple yields in the Cumberland-Shenandoah region of Pennsylvania, Virginia, and West Virginia, in cooperation with the State experiment stations and other bureaus of the Federal department. The physical characteristics of the region were found to be generally suitable for orcharding, although some orchards are so located that it would be very difficult to produce apples economically. In general, the major causes of low yields in the region are attributable to practices over which the farmer has considerable control. Suggestions were made for improving the management of orchards so that more economical production would be obtained. There is an apparent need for studies of profitable orchard management and adjustments in the systems of farming in a number of the apple areas.

The final aim of the study of the apple industry is to indicate adjustments that will prove profitable to the grower. The results of the research work now done along the lines indicated will be used in connection with statistics gathered on the ages and varieties of trees in commercial orchards to point out how the farmers of the different apple sections may make improvements in the operation of their business and better adjust their production to market requirements.

#### RETURNS TO PEACH AND STRAWBERRY GROWERS

Following the previous year's study of the general fresh peach situation in the important commercial peach-producing States, a study was made in cooperation with the New Jersey Agricultural Experiment Station of the factors which affect the returns at

New York City to peach growers in New Jersey and the Southern States. Annual, weekly, and daily supplies in New York were analyzed for the purpose of showing the quantities of fresh peaches which New York City will take at various prices. The effect of the use of cold-storage facilities on returns and the conditions under which it pays to store peaches were determined. New York's preference for specified varieties, grades, and sizes of peaches as measured by price differentials was thoroughly treated. This study yielded facts of much value to the grower and is encouraging from the standpoint of developing methods of research. Late in the year a similar study of strawberries was undertaken in cooperation with the Arkansas experiment station.

#### EUROPEAN CORN BORER

The establishment of the European corn borer at the northeastern edge of the Corn Belt makes it necessary for farmers in that area to adopt methods of control which are most likely to prevent or most effectively minimize commercial damage. The control practices which are necessary involve substantial changes in the usual methods of handling corn on Corn Belt farms, particularly with respect to the disposal of cornstalks, stubble, or other refuse in cornfields and the preparation of cornland for subsequent crops. In a study of the cost of the various methods of disposing of cornstalks and other refuse it was found that the amount of labor necessary varied widely in different parts of the present infested areas because of the variation in the number of acres grown per farm, the present methods of harvesting corn, and the usual means of preparing cornland for small grain the following year. Information obtained from several hundred farmers in Ohio and Michigan was used in determining the most economical methods of meeting control requirements under various conditions as found on farms in this area. A Farmers' Bulletin, *Farm Practices Under Corn Borer Conditions*, was based in a large part upon this study.

During the year data were obtained and analyzed showing the methods of harvesting corn and preparing corn ground for subsequent crops in Ohio, Indiana, and Michigan. These data indicate the areas in which various types of adjustments in methods of growing corn are necessary because of the corn borer.

One means of utilizing cornstalks and at the same time destroying the borer is to use the husker-shredder. In order to determine the conditions under which this means of meeting the problem would be desirable, a special study of the use of the husker-shredder in Ohio, Michigan, Indiana, and Illinois was made during the year. The cost of shredding as compared with other methods of utilizing or disposing of stalks, the feeding of shredded stover and the problem of storing shredded stover were all carefully considered in this study.

As a basis for more detailed analytical studies of the problem facing farmers in adapting their farming systems and corn-production methods to corn-borer conditions, a special study of types of farming in the eastern Corn Belt was inaugurated during the year.

#### **COST OF PRODUCING STAPLE CROPS**

Cost-of-production studies of corn, wheat, oats, cotton, and potatoes were continued. Reports from farmers located in many parts of the country were analyzed and the results published. The continuous collection of these data makes it possible to construct indices showing general changes from year to year in production costs. In cooperation with the Arkansas and Utah Agricultural Experiment Stations the costs of producing apples were determined. Particular emphasis was given to the various varieties grown and the economic place of orcharding in the organization of farms.

#### **METHODS OF PREPARING JOHNSON HAY FOR MARKET**

To enable farmers of the Black Prairie Belt of Alabama and Mississippi to make better use of much of the land on which Johnson grass is now grown, attention was given to the problems encountered by farmers in the production and preparation of Johnson hay for market.

Emphasis was given to market requirements for the hay of this area; to causes of low-grade hay and practices that result in the maximum production of hay of high quality. The practices followed on the more successful hay farms were determined and set forth as examples of good methods of handling Johnson hay.

#### **RANGE-CATTLE PRODUCTION**

Studies embracing the important range-cattle producing areas were con-

tinued in cooperation with the Bureau of Animal Industry and State experiment stations and extension services. The results of these studies are being used as a basis for definite recommendations to ranchmen. It has been determined that the poor returns on some ranches as contrasted with the excellent returns on others are due in most instances to the size of business being too small to provide sufficient income to meet the necessary operating expenses which are usually higher in proportion to the income on the smaller outfits. Arrangements have been made for providing ranchmen with information on the outlook for beef cattle and especially on the demand for feeders in the Corn Belt, and at the same time information on the situation in the range areas will be disseminated among the feeders.

#### **SYSTEMS OF HOG PRODUCTION ON CORN-BELT FARMS**

The previous year's study of the economics of pork production on Corn-Belt farms was continued. Particular attention was given to the conditions under which it pays to follow the one and two litter systems of production. Climatic conditions and the quantity of corn produced on the farm affect in a general way the choice of the systems of production. Corn-Belt areas typified by large farms and heavy yields of corn tend toward a greater use of the one-litter system. Although the rate of marketing hogs varies from year to year as favorable or unfavorable feeding conditions prevail, there is a relationship between the system of production and time of marketing the hogs. Spring pigs produced under the two-litter system usually are marketed during the early fall months, and pigs from the one-litter system generally are marketed during the winter. There appears to be a relationship between the system of pork production followed and the organization of the entire farm business. Attention is being given to the systems of farming that are proving most profitable with the two systems of hog production.

#### **HOGS IN THE PEANUT AREAS OF ALABAMA AND GEORGIA**

As a direct development of last year's study of livestock possibilities in the coastal plain region an economic study of farm organization in the peanut areas of Alabama and Georgia with reference to hog production was undertaken in cooperation with the Alabama



and Georgia experiment stations. A report was issued in which the relative economy of various systems of grazing and feeding hogs was set forth. The necessity of using high-quality grazing and finishing crops during the summer feeding period for increasing the gains in weight made by the animals was pointed out. Consideration was given to the most profitable size of the hog enterprise in relation to the farming system for farms of different sizes, the organization and management of the hog enterprise for the most economical production of pork, and the organization for the efficient use of labor, equipment, and by-products of the farm. The need for definite systems of hog production is so great that an effort will be made to formulate tentative systems at an early date.

#### POULTRY PRODUCTION

Cooperative studies of farm-management problems on commercial poultry farms in New York were continued. Special attention has also been given to the analysis of information relative to the trends of the poultry industry in various sections of the country and the significance of these trends to producers in the different areas. The importance of following farm-management practices which are essential in the production of high-quality products for which premiums are paid is indicated by these studies.

#### ECONOMICS OF BEEKEEPING

A study of apiary operation and management was undertaken in cooperation with the Bureau of Entomology and several State colleges of agriculture. The present study is confined to the intermountain region. Later it is planned to expand the study so as to include other regions.

The object of the study is to determine for apiaries of different types and sizes (1) the labor, power, and material requirements in honey production, (2) the kind, amount, and cost of house and apiary equipment needed, and (3) detailed plans for the organization and operation of successful apiaries. Forty apiaries are keeping careful and complete records of all operations.

#### SOURCES AND USES OF FARM INCOME

In cooperation with the Ohio experiment station, a study was made for the purpose of determining the conditions

of farming and of family living in a region of low incomes and low expenditures. This study is discussed under the Division of Farm Population and Rural Life.

#### FARM RETURNS

Voluntary reporters submitted statements of the financial results of operation for their own farms for 1927. The average return of \$1,290 shown by the reports of 13,859 owner-operators for 1927 was higher than in previous years, except 1925 when 15,330 farmers from the same general list reported returns averaging \$1,297.

The return of \$1,290 per farm in 1927 was made by farms averaging 275 acres in size, representing an investment of \$15,445 at values current on January 1, 1927, and consisted of \$1,048 excess of cash receipts over cash outlay for current operating expenses and an increase of \$242 in the inventory of crops, livestock, machinery, and farm supplies during the calendar year.

In addition, the farm family had food produced and consumed on the farm the estimated value of which on the farms reporting the item was \$273, and fuel and house rent, the values of which were not reported. On the other hand, interest averaging \$201 paid on indebtedness and outlays for improvements averaging \$141 were not included in the computation of current cash operating expenses.

Improvement in returns in 1927 as compared with returns from the farms reporting for 1926 was shown for all the geographical divisions except the East North Central States in which increases in reported receipts were more than offset by increases in cash outlay. The largest increase was in the Western States, where improvement in cattle values were specified by many reporters as contributing most largely to larger receipts and to better financial conditions at the end of the year.

Sixty-five per cent of the reports for 1927 showed returns less than the average, \$1,290. Only 8 per cent of those reporting showed net losses from operations of 1927, as compared with 14 per cent in 1922 and with 10 per cent in 1925, the most favorable year for which these reports have been assembled. About three-fifths of the returns have fallen each year in a group ranging from 0 to \$1,499; the largest single group has been that ranging from 0 to \$499.

## DIVISION OF CROP AND LIVESTOCK ESTIMATES

W. F. CALLANDER, *in charge*

Increasing interest on the part of the public in crop and livestock reports and a more widespread demand for statistical information concerning agriculture has marked the year just closed. The number of inquiries received by mail, as well as by telegraph and telephone, has exceeded that of any previous year.

In order to meet this growing demand, the work has been expanded in several directions. No increase in personnel has occurred, however, the increased work being made possible through better arrangement for handling reports.

The price work has been enlarged to include a series of schedules on which prices are obtained on articles farmers buy, to be used as a better basis for an index of the purchasing power of the farm dollar. Work has been done in laying the foundation for a system of regular reports and estimates covering poultry, eggs, and milk. Marked progress has been made in estimating the annual production of livestock by States. The Washington statistical staff devoted much time to the compilation and analysis of data to be used in determining the annual income of farmers, by States.

Much time also has been given to the preparation of material for the outlook and intention-to-plant reports, both of which are receiving more widespread attention and are assisting in bringing about a better adjustment in agricultural production.

Notable progress has been made in the development of special statistical methods to be used in estimating acreage from sample data, and the forecasting of crop production and yields from weather, and other factors. The application of improved statistical technic will result in increased accuracy in the crop reports.

### AGRICULTURAL PRODUCTION AND INCOME

Information has been gathered during the past two years from farmers with respect to the disposition of the principal crops grown on farms of the United States. On the basis of this material estimates have been made, by States, of the proportion of the various crops which are sold off farms. These estimates have been made a part of the statement issued by the bureau

upon the evaluation of agricultural production, and the determination of cash and gross income of farmers.

Estimates have also been completed this year of the production of meat animals and value of such production by States. In making these estimates there have been utilized data collected on carloadings and unloadings of livestock, by States, the origin of livestock received at principal livestock markets, by States, and the pig, calf, and lamb crop surveys which have been made the past few years. On the basis of the same data in a slightly different arrangement an estimate has been made of cash income and farm consumption of meat animals and meat which constitute the estimates of income. Estimates of both production and income have been completed for four years, 1924 to 1927, inclusive.

A thorough analysis has been made of all available data upon the production, consumption, and sale of dairy and poultry products for use in connection with the estimates of the value of agricultural production, cash and gross income of farmers in the United States. In arriving at these estimates the monthly inquiries on milk and eggs produced and on chicks on hand have indicated very definitely that a more accurate measure of fluctuations in annual production can be obtained from this type of data than from a single annual inquiry.

There has been a great demand for information of this character, which heretofore has been furnished only for the United States as a whole. The department, as well as a number of agencies outside the department, have in the past made attempts to break down the estimate for the United States into estimates for individual States. While there are a great many details for which adequate information is not yet available, it is felt that the estimates as they have been tentatively published represent a closer approximation of the actual income than was secured from any method heretofore used.

### RESEARCH IN CROP-REPORTING METHODS

The analysis of sample data has made progress during the past year. In connection with the statistical conference held in 1928 for the field force of this division, the yield per acre sample data were analyzed for 16 different States. A start was made also on the analysis of individual farm acreage sample data. The analysis of



the acreage sample for several States has been completed and will be published as a technical bulletin. This analysis of the basic sample material has led to a better comprehension of the statistical problems involved in connection with the utilization of different kinds of sample data as a basis for estimates of crop and livestock production. Improved methods of handling current data have been developed as a result of these studies.

The study of the relationship of weather to crop yields has made substantial progress in several States. A critical analysis is being made of the relationship between monthly condition figures and final yield for the major crops in the more important States. This critical analysis shows where the present method of interpreting condition figures in terms of probable yield is satisfactory and also brings to light cases where there is little if any relationship between the condition of the crop and the final yield per acre.

The time-series analysis of crop and livestock data is fundamental to the further development and improvement of the forecasts and estimates. A great deal of this work, however, must be done by statisticians in the field offices. An adequate analysis and interpretation of changes in yield per acre from year to year can best be made by the research worker who is thoroughly familiar with the State with which he is working and in close contact with other scientific agencies within that State. For this reason it is necessary to have research men in a number of the field offices. Research studies concerning the yield per acre of crops will lead to a statistical measurement of many of the fundamental laws of plant growth. An analysis of changes in acreage or numbers of livestock will lead back to the fundamental principles of economics and psychology. It is only by such an analysis and interpretation that the science of estimating and forecasting crop and livestock production can properly be developed.

#### FARM PRICES

The outstanding development of the past year in the field of farm price reports is the progress that is being made in meeting the demands of the agricultural colleges for regional farm prices for use in connection with outlook projects. In Colorado, for example, this division is cooperating with the State agricultural college on

a project which will make available monthly farm prices by economic agricultural areas within the State. This necessitated a redistricting of the State into nine economic areas which differ materially from the original crop-reporting districts of the State. A similar project is under way in co-operation with the Oregon State College of Agriculture, and arrangements are pending in several other States.

Crop-year average annual prices have been computed by States for practically all farm products from 1919 to 1927. These State prices will be used in connection with the evaluation of agricultural production and income and the determination of farm income by States, and will be submitted for publication in the near future.

The farm-price reports have been materially improved during the past three years. A larger and more representative sample is now being secured. The increase in returns has been effected by only a comparatively small increase in the list of correspondents and is largely due to the monthly News Letter to Price Reporters, which has stimulated the interest of the correspondents and increased the regularity of their reports.

#### RURAL RETAIL PRICES

The rural retail prices collected are now being used as the basis for the Department of Agriculture index number of prices paid by farmers. This index is now used instead of the Bureau of Labor wholesale index of nonagricultural commodities for computing the purchasing power of agricultural prices and farm income. The lists of correspondents, as well as the actual returns for this inquiry, have been expanded several hundred per cent during the past year and a half, following the reorganization of this inquiry.

#### TRUCK-CROP REPORTS

Estimates of intention to plant, planted and harvested acreage, forecast and harvested production, prices received each month by growers and total farm value, distribution and storage, and condition of the growing crops were made on 19 crops. These estimates covered crops produced for table use and for canning and manufacture. The information used in making these estimates was obtained by 371,000 schedules mailed to correspondents on the truck-crop list and from special reports received from



State agricultural statisticians. The Truck Crop News, in which most of the 193 reports made on the above-named crops were published, together with notes regarding weather and growing conditions, was issued throughout the year.

#### COOPERATION WITH STATES

During the past year cooperative agreements for the conduct of the crop-reporting work have been entered into with the College of Agriculture of Tennessee and the State Experiment Station of Ohio, thus making a total of 33 States in which the crop-reporting work is carried on in cooperation with State agencies. Negotiations are pending in two or three additional States. The contributions which are made by the cooperating agencies for the conduct of this work have made it possible in recent years to greatly expand the scope of the work in a number of States and have permitted the preparation and issuance in a number of States of county estimates of crop production covering the principal crops and livestock. The fact that the State agencies are cooperating in the work is tending to increase local interest in the reports and makes it possible to reach a larger number of farmers than has heretofore been possible.

#### ORGANIZATION

The decentralization plan which was put into effect last year is working out very satisfactorily, particularly with respect to the estimating of acreage and numbers of livestock on farms. Under the present plan from two to three visits a year are paid to each field office by a representative from the Washington staff. Marked advantage has resulted from having all of the data relating to acreage and number of livestock in one place, making it possible to arrive at better figures than have heretofore been possible.

During the past year 2,542,000 schedules were mailed out by the Washington office and 4,500,000 by the field offices. Because of the fact that practically all of the schedules relating to acreage and livestock, including the rural-carrier surveys, are now handled by the field offices, there has been a marked increase in the number of schedules handled by the field offices and a corresponding reduction in the number sent out and handled by the Washington office.

The division acts as a service unit for a number of the research divisions of the bureau, many thousands of schedules having been sent out on inquiries relating to farm management, land economics, farm life and rural population, as well as various commodity studies. This has resulted in a marked saving to the bureau since this division has already an organization established for handling schedules expeditiously and economically.

#### DIVISION OF COTTON MARKETING

ARTHUR W. PALMER, *in charge*

The Division of Cotton Marketing is engaged in service and regulatory work under the United States cotton futures act, the United States cotton standards act, and the act of March 3, 1927, "authorizing the Secretary of Agriculture to collect and publish statistics of the grade and staple length of cotton," and in research and demonstrational work in related fields.

On April 12, 1928, the President approved an act entitled "An act relating to investigation of new uses of cotton," under which the Secretary of Agriculture and the Secretary of Commerce are authorized to engage in technical and scientific research in American-grown cotton and its by-products and their present and potential uses, including new and additional commercial and scientific uses for cotton and its by-products, and to diffuse such information among the people of the United States. This act will result in the further extension of the cotton-research program.

#### STAPLE STANDARDS

Representatives of the cotton growers', manufacturers', and shippers' associations, and of cotton exchanges were invited to Washington to witness the selection of bales of cotton suitable for original representations of the staple standards and for use in making practical forms of the standards for public distribution. A number of bales of each length represented by practical forms were selected, and the Secretary signed an order to be effective August 1, 1929, designating one bale of each length as the "original representation." It was provided that prior to the effective date of such original representations, practical forms might be prepared for public distribution which might be used as permissive standards in the purchase and sale of cotton. In-

dications are that these standards will be extensively used by the trade.

#### MILLIMETER DESCRIPTIONS

The official staple standards and the millimeter descriptions in use have received much attention. Misunderstandings have arisen between European buyers and United States shippers with respect to the cotton which might properly be shipped against stated millimeter descriptions. Many complaints have been made as to the outcome of arbitrations in Europe on cotton sold on these descriptions. Early in June, 1928, the American Cotton Shippers' Association submitted a written request for an interpretation of the provisions of the cotton standards act which would apply to the present use of millimeter descriptions in purchases and sales of cotton in interstate and foreign commerce. This communication was referred to the solicitor of this department, who rendered an opinion to the effect that under present usage millimeter descriptions as applied to cotton which is of or without the lengths embraced in the official standards are contrary to the United States cotton standards act. This opinion was made public through the press on June 15, 1928.

#### EXTRA WHITE STANDARDS PROMULGATED UNDER THE COTTON FUTURES ACT

The standards for extra white cotton, grown chiefly in the arid and semi-arid regions of the Southwest, were first established, effective August 1, 1927, under the United States cotton standards act. On August 30, 1927, the Secretary signed an order, effective September 1, 1928, under which cotton equal to the standards for Extra White will be recognized as tenderable on future contracts under section 5 of the United States cotton futures act.

#### CLASSIFICATION OF COTTON UNDER THE COTTON FUTURES ACT

The law specifies that all cotton intended for delivery on future contracts shall be classified by officers of the department. The total number of bales classed by the boards of cotton examiners at New York, New Orleans, and Houston-Galveston, Tex., was 137,715 bales, and reviews of 26,943 bales were made by the Appeal Board of Review Examiners in Washington and the boards of cotton examiners in the field.

The provision by the New Orleans Cotton Exchange for optional deliv-

eries on its future contracts in Houston and Galveston, Tex., has increased the work of the Board of Cotton Examiners established to serve these markets, in connection with deliveries on the future contracts of the Chicago Board of Trade.

By reason of the large stock of certificated cotton which was on hand in the port of New York during the greater part of the fiscal year and because of technical conditions in the future markets, the volume of classification work was smaller this year than last.

Collections during the year amounted to \$59,370.79 and disbursements to \$137,035.61. Of the total collections \$6,917.24 was for loose cotton and the balance for classification fees. A balance of \$119,254.90 was in the Treasury on July 1, 1928, for continuing the work during the fiscal year, 1929.

In April and May, 1928, the 172,002 samples representative of the certificated stock in New York, as it stood in March of this year, were examined by a committee of experts employed by the Senate subcommittee investigating the cotton situation. A total of 6,761 of the samples were put aside as doubtful or untenderable under the cotton futures act. Subsequently the Appeal Board of Review Examiners, in company with a committee of expert classers from the cooperative associations and the Boston arbitration committee and the joint southern arbitration board, classified redrawn samples from the 3,316 bales which remained in stock of the 6,761 just referred to. Those found to be actually untenderable numbered 1,425. Of these the classification of 929 bales was not final, this number of bales having been until this time subject to review in the usual manner.

#### CLASSIFICATION OF COTTON UNDER THE COTTON STANDARDS ACT

Under section 4 of the cotton standards act any person who has custody of or a financial interest in any cotton may submit the same to the department for classification, and the various boards of cotton examiners established under the cotton futures act are authorized to perform this additional service. A total of 15,287 bales were classed under this act.

#### LICENSING OF COTTON CLASSERS

Forty-five examinations were given to applicants for licenses to class cotton under the cotton standards act,



and 56 licenses were granted, including 31 renewals. Applicants for licenses as classers under the United States warehouse act are required to submit to the same practical test as applicants for licenses under the cotton standards act, and a number of such tests were conducted. The employment of licensed classers by the cooperative associations and the trade generally has done much to encourage the public use of the official standards.

#### PREPARATION AND DISTRIBUTION OF OFFICIAL COTTON STANDARDS

Practical forms or copies of the official cotton standards are prepared and sold to the public. During the year 4,625 boxes of the standards for grade and color, and 10,762 staple types were distributed, as compared with 6,278 boxes and 5,720 staple types during the fiscal year 1927. The sum of \$31,568.53 was collected from sales of practical forms of the standards. Sales of loose and rejected cotton amounted to 563 bales, for which the sum of \$42,425.90 was received. During the year 568 bales of cotton were purchased for the preparation of practical forms at a cost of \$70,111.27.

Classing schools were conducted in cooperation with the Oklahoma Agricultural and Mechanical College, Stillwater, Okla.; the North Carolina State College of Agriculture and Engineering, Raleigh, N. C.; Clemson Agricultural College, Clemson College, S. C.; and the Texas Agricultural and Mechanical College, College Station, Tex. Demonstrations of the standards in the European markets have been continued. The technical representative of the bureau, through contact with different European trade organizations and individuals, continues to give valuable assistance toward encouraging the successful and satisfactory use of the standards for grade and color in accordance with the universal standards agreements.

#### FUTURE AND SPOT MARKET INVESTIGATIONS AND COTTON PRICE QUOTATIONS

Closer supervision has been maintained over the quotation of commercial differences in the designated spot cotton markets, and the work was considerably extended, particularly in the collection and dissemination of prevailing premiums for staple cottons as quoted in various cotton-growing and consuming districts. An unusual demand for these data was in evidence from many and varied sources. This

phase of the work is of particular value to growers of such cotton, as it enables them to have a more accurate knowledge of the value of their product. Moreover, the American futures exchanges by amendments to their rules have made cotton of  $\frac{1}{8}$  and 1 inch staple tenderable on future contracts at premiums above cottons of  $\frac{7}{8}$  inch.

The particular objects of this project are to insure that tenderable cotton of grades other than Middling deliverable on future contracts made subject to section 5 of the United States cotton futures act shall be settled for at the actual commercial differences in value, and thus to aid in the maintenance of a proper parity between prices of future contracts and spot cotton; and further that producers, merchants, manufacturers, and others interested in spot cotton may be reliably informed as to prices and values of cotton.

The cotton price quotation service has been maintained in five districts, of which Charlotte, N. C., Atlanta, Ga., Memphis, Tenn., New Orleans, La., and Houston, Tex., were headquarters. Reports of purchases and sales of cotton were gathered, and daily and weekly cotton reviews and bulletins were published showing the prices at which the various grades of cotton were sold. In addition to cotton-price data there were included data on prices of cottonseed and cottonseed products. Newspapers and periodicals were glad to publish information assembled, and cooperated with the bureau in this work by publishing daily and weekly reports on the price data which were furnished by Washington and the field offices. Included in the information generally disseminated were quotations giving prices based on active futures months on the future exchanges. This enabled those owning cotton of  $\frac{7}{8}$ -inch staple up to  $1\frac{1}{4}$  inches readily to ascertain a close approximate value of their holdings.

#### PREPARATION AND DISTRIBUTION OF STANDARD GRADES FOR AMERICAN COTTON LINTERS

At the request of the industry, the Secretary of Agriculture on October 31, 1927, established and promulgated standards for color for American cotton linters. These standards are descriptive and are based on the normal color of linters, as carried in the samples used in constructing the original standard grades.

In cooperation with mattress manufacturers and with the bureau of bedding of the department of labor and industry of Pennsylvania, samples of



felt have been prepared of linters of the different grades and characters represented in the official standards. These felts are being subjected to various tests to determine the relative value of "character" and "grade" in cotton linters for mattress purposes. The value of the use of standards has been demonstrated by a chain of mills which used the standard grades for linters successfully on all sales of this commodity and in control of manufacture.

To date 1,608 copies of the official standards for cotton linters have been distributed, and 1,871 samples have been classed during the year.

#### COTTONSEED STUDIES

Additional data have been secured confirming the theory that the net kernel content of cottonseed is a closer and more constant index of the true value of cottonseed for crushing purposes than any other factor. Experimental machines have been designed for the purpose of separating the meats from the hulls and other forms of foreign matter, so as to determine the kernel content, but none of them as yet has proved completely satisfactory.

A study of the values of the two principal products of crushing, oil and cake, brought out the fact that the ratio between the value of a unit of oil and of a unit of protein was practically constant, the variation being less than 5 per cent. The average oil-cake equivalent found in the analyses of 15,000 car lots of seed was 555 pounds. On the basis of this oil-cake equivalent, 555 pounds, as 100 per cent value, a table of percentages of value has been constructed for regular increases and decreases in pounds of oil cake. The method of determining quality through the determination of the free fatty acid content of the extracted oil has proved not only to be highly satisfactory but to have a positive correlation with the manufacturing or refining losses of the oil. A table of discounts has been prepared for each significant increase in the percentage of free fatty acid found to be present. With these two tables the relative value in percentages of the basis quotation of any lot of cottonseed can be found when the chemical determinations have been made.

#### RESEARCH IN COTTON MARKETING

##### STUDIES OF THE COTTON MARKETS

Progress was made on two marketing studies during the fiscal year.

The data procured in the study of cotton quotations in the Houston market, begun during the preceding fiscal year, have been organized and presented in graphic form. The charts indicate the extent to which in the season studied variations occurred between the actual price of cotton sold and the quotations of particular qualities. Actual sales prices tended to run above quotations. Prices and quotations were closest together at the peak of the season and farthest apart in the dull season. The Houston market is regarded as one of the two or three most systematically quoted spot markets in this country, and it is believed that the methods in use have been improved since the time the study was made. It is hoped, therefore, that this study may be later continued. The charts indicate the desirability of study of the methods of quoting cotton in other designated spot markets.

During the past year, studies of the relation of local prices to grade and staple length of cotton sold have been made in cooperation with the Texas Agricultural Experiment Station and Georgia Agricultural Experiment Station. A less formal cooperative relation has been carried on also with the South Carolina and the Alabama stations. Work is now in progress to present the results of these studies.

#### GRADE AND STAPLE ESTIMATES

Grade and staple estimates were made in Georgia and in an area partly in Texas and partly in Oklahoma. Each area produced approximately a million bales of cotton the past year.

Reports were issued in the form of estimates of the grade and staple length and tenderability on futures contracts under the United States cotton futures act of the cotton ginned in the areas referred to.

Plans are well under way to carry out fully during the coming season the provisions of the act of March 3, 1927, which provides for the collection and publication of statistics of the grade and staple length of the carry-over and of the crop as a whole. Offices have been opened at Atlanta, Memphis, Dallas, Austin, and El Paso, and much thought has been devoted to preparing the organization for the work.

#### UTILIZATION OF COTTON

Work progressed satisfactorily in the study pertaining to the utilization of American cotton by grade and sta-

ple length. In February a report was issued entitled "Domestic Mill Consumption of American Cotton by Grade and Staple," which elicited much favorable comment throughout the United States. Types are being received upon which to base next year's work. In addition, actual samples of cotton consumed in 15 representative establishments using lint from  $\frac{7}{8}$  to  $1\frac{1}{4}$  inches commercial length are being procured. These samples of cotton actually consumed serve as a general check on the accuracy of the reports of cotton consumed made by individual consuming establishments. In this work excellent cooperation has been had from the spinning industry as a whole through the Cotton-Textile Institute of New York, as well as from spinners individually throughout the spinning districts.

#### NEW USES FOR COTTON

Studies have been made on new uses for cotton and reports issued on the following subjects: "Cotton Bagging for Cotton"; "Farm Uses for Cotton and Its Products"; "Cotton bags in the Wholesale Grocery Trade." In addition, a supplementary study on "Cotton Bags in the Wholesale Grocery Trade" is being made in cooperation with the American and National Wholesale Grocery Associations.

A study is under way, in cooperation with the National Fertilizer Association, of the amount of fertilizer handled in cotton bags, size of packages, suitability of cotton containers for fertilizers, relative cost of cotton and jute bags for fertilizer, and utility of bags on farms after being used for fertilizer. In cooperation with the Texas Agricultural Experiment Station, a shipping test is being made on cotton bags as containers for wool and mohair, and a study of the relative prices of different bag materials for different purposes is being carried on.

#### COTTON-FIBER RESEARCH

Cotton-fiber research is a field of much promise. Work of this kind is fundamental, being essential both in economic study and in economic progress in our cotton industry. It is necessary as well to efficient administration of the service and regulatory work of this division. Work has been begun on determining the relationships between fiber quality and the quality of cotton products. A beginning has been made in the development of meas-

ures of quality, first attention being given to uniformity of length.

#### COLOR TESTING

The Munsell system of color measurement has been adapted to cotton, making it possible to test cotton for color with scientific precision. This method holds promise of great usefulness in the future, in the fundamental work of establishing the relationship between the color of cotton and the color of gray, bleached, dyed, and mercerized yarns and fabrics, and of determining the importance of color as a factor of cotton quality.

#### SPINNING TESTS

Further technical studies have been made during the year on fiber length and strength as related to yarn strength. Samples of fibers taken from each lot of cotton submitted for tests have been tested for strength by the bulk method developed in this bureau. The results of a series of these fiber tests have been correlated with the spinning results of the cotton thus tested. From these data a formula has been derived by use of which the probable strength of yarn can be estimated in advance of spinning from the data on a small sample of cotton. The results of many of these tests have been published in preliminary reports, and the results of others have been submitted as office information.

During the past year at Clemson College 82 regular lots of cotton, including different grades, staples, and varieties, have been tested, and 39 check tests for special information of the testing force and the division have been conducted. At College Station 52 regular lots of cotton, including different varieties, ginning studies, and harvesting studies have been tested.

#### DIVISION OF FRUITS AND VEGETABLES

WELLS A. SHERMAN, *in charge*

The division was under the direction of F. G. Robb during the greater part of the year, during which time Wells A. Sherman was chief of the division of markets of the California Department of Agriculture under a cooperative agreement between the State of California and this bureau.

#### MARKET NEWS SERVICE

Greater publicity than ever was obtained for news regarding crops and



markets, through extension of the series of sectional reviews, issued either weekly or monthly. These reviews, adapted to a particular region or section, are widely published in newspapers and farm journals and have a large circulation. The series of special commodity summaries or reports, issued at the opening of the season for important products, was also extended and has met with great favor.

New temporary offices in producing sections were added for winter lettuce in Arizona, miscellaneous vegetables in the Belle Glade-Chosen district of Florida, and onions at Farmersville, Tex. Local and State agencies cooperated to a greater extent the past year in conducting the work at temporary field stations. The total shipments of 38 fruits and vegetables as reported during the year increased only slightly to 1,044,000 cars, mainly because of the reduced production of tree fruits.

The outstanding cooperative project was the clearing house for California grapes. One member of the technical staff was furloughed to assist with this work, and another man was employed on a cooperative basis during the grape-shipping season. Comprehensive arrangements with the railroads made it possible to obtain the reports desired by the clearing house, and all market-news representatives in important cities cooperated in this work. The clearing-house operations were expanded during the 1928 season to include deciduous-tree fruits. This general plan of aiding in the orderly marketing of heavy crops of fruits and vegetables—the clearing-house plan—appears to be meeting with greater favor each year.

The bureau's 7,500 miles of leased telegraph wires continued to be a means of rapid dissemination of market news, including shipment reports, arrival and price information, and statements regarding local conditions in producing sections and terminal markets.

#### TRANSPORTATION LINES FURNISH CAR-LOAD-SHIPMENT INFORMATION

The total of 1,043,946 cars of 38 products represents a net increase of about 1,750 cars over the number in 1926. The gain would doubtless have been greater had there not been a generally short crop of tree fruits in 1927.

Daily telegraphic reports are received at Washington from several hundred transportation lines, showing the number of cars originating in each division

superintendent's territory. About 68 of these reports are known as "consolidated wires," each covering an important railroad system or major portion of such a system. Approximately 400 individual division superintendents or other reporting officials send daily wires in season, making a total reporting daily of 468. About 15,000 local freight and express agents send monthly (station) reports by mail, covering a greater number of products than those in the daily wires.

In cooperation with the clearing house for California grapes in 1927, grape shipments were segregated as between white and black varieties and juice and table stock. At certain important gateways daily passings were obtained from each railroad concerned. At all city market stations, daily arrivals of grapes, the number of cars on track, and the daily unloads were secured. On Friday of each week a detailed list of cars held for disposition was furnished the clearing house. For the season of 1928 more information will be obtained from railroads. In addition to the regular market stations a number of other important cities have been included, from which daily information is received. A large number of tree fruits have been included, along with grapes, in the clearing-house program for 1928.

During 1927, the market news service conducted 38 temporary field stations, and a number of market stations served near-by producing areas. In most instances, the carriers furnished such offices with daily wires on certain commodities, including destinations of shipments. Some of the offices received passing-point information.

#### MARKET REPORTS ON PEANUTS

Weekly reports were issued from Washington which contained all information gathered from various sources. Quotations covering prices paid for farmers' grade stock and selling prices for shelled and unshelled peanuts, peanut oil, and peanut meal and cake have been furnished by branch offices. Supplementary information on prevailing prices in the producing areas has been obtained from peanut brokers in the large consuming centers. Weekly telegrams from a number of the branch offices furnish reports on car-lot arrivals and boat receipts during the past week, market conditions, and selling prices or quotations on large lots of both cleaned and shelled peanuts.



Records of peanut shipments have been obtained through the agents of the different railroads and boat lines serving the Virginia-North Carolina, the southeastern and the southwestern producing areas. The bureau representatives on the Pacific coast furnish information as to market conditions and prices of Chinese peanuts, f. o. b. Pacific coast points, and the importations of peanuts and peanut oil. Information is also obtained on imports from the Department of Commerce.

#### MARKET REPORTS OF HONEY AND BEESWAX

About 110 important beekeepers and honey shippers report market prices, conditions affecting colonies and nectar-producing plants, etc., which are combined for publication in the honey market news reports issued from Washington. Bureau representatives also wire semimonthly reports of the market conditions and of the prices of extracted and comb honey in their respective cities. Reports from several markets cover beeswax also. Statistics of the imports and exports of these commodities have been obtained from the Bureau of Foreign and Domestic Commerce and published in the market reports.

#### UNLOAD REPORTS FROM PRINCIPAL MARKETS

Reports of unloads of important fruits and vegetables are received from 66 cities. Representatives of the bureau in 25 markets and railroad agents in 41 other markets furnish reports of the number of cars of each of the 19 principal fruits and vegetables unloaded. Reports are received also from boat lines. Unload information has been prepared in condensed form to supply the increasing demand for such data. The figures are used in summaries of the business of a season in specified producing sections and in other reviews. The data are of great value because they show the monthly and annual receipts of various products in large consuming centers, as well as the sources of supply. Press releases or mimeographed statements are prepared for public distribution on the basis of these figures.

#### REVIEWS, SUMMARIES, AND SPECIAL REPORTS

The Washington office maintains current tabulations of market prices and

records of conditions prevailing at all the leading markets and shipping points, prepares special reviews and summaries based largely on these statistics, and writes articles for trade papers and farm journals.

The Weekly Market Review of Fruits and Vegetables analyzes and compares the market movement and prices of the week. The review is circulated from Washington and is also sent by leased wire each Tuesday to the branch offices for duplication and circulation. Wider distribution is effected through newspapers and other journals on the mailing lists at the respective offices.

Each Tuesday the Weekly Summary of Car-lot Shipments is mimeographed and distributed. This publication is statistical in nature and summarizes in comparative columns the car-lot shipments of the principal fruits and vegetables as reported telegraphically by the carriers each day. It affords a valuable comparison of the past week's shipments with those of the preceding week and with the corresponding period of the year before.

A monthly market review, issued about the 15th of the month to 15 farm papers and 6 newspapers, tells of the market trends during the preceding four weeks. One review is prepared on the 1st of each month for the special benefit of six papers that go to press early, and another on the 10th of the month.

Short weekly reviews adapted to various sections of the country are issued to about 20 farm journals and 35 newspapers or press associations. These get a wide circulation and are very popular.

Combination reviews are prepared for a large number of papers which summarize the market conditions for cotton, grain, hay, livestock, meats, poultry products, butter, cheese, wool, etc., along with a summary of the fruit and vegetable situation. The circulation of these reports is very extensive among the farming population in all parts of the country. A special weekly report also is prepared for radio broadcasting.

The monthly issues of Crops and Markets contain several pages of statistical material showing car-lot shipments by States and by products, and monthly range of jobbing prices on the principal fruits and vegetables.

The series of special commodity reports has been continued and has met with great favor. Several pages of

text discuss the crop and market prospects for the coming season and analyze the statistical matter published with the report. Tabulations relate to acreage, production, shipments, unloads, prices, etc., so as to bring together all the available material affecting the market position of the particular product at the height of the season.

Work is done through the Associated Press and other news agencies. Some field stations also have been able to use this extensive publicity service.

After the close of each temporary field station the local representative writes a summary of the daily information that was published during the period of operation, together with a general review of the marketing season in that territory. This summary is distributed to all persons who request a copy and to the press. This summary in the hands of farmers points out the successes and failures of the past season, and serves as a guide in the planting, harvesting, and marketing of the crops the following season.

Early each year mimeographed tabulations are issued showing the total monthly car-lot shipments of each of 38 fruits and vegetables, on the basis of originating States. These annual shipment reports or summaries for each product are in great demand. Thousands of copies are distributed, as they furnish one of the best and simplest means of determining the general shipping season for a particular fruit or vegetable in any State.

#### COOPERATIVE WORK INCREASES

Cooperative market news work was continued in 20 States. In 6 of these States the fruit and vegetable work has been incidental to a general market news program, but in the other 14 States specific fruit and vegetable work has been provided for. All except three of the temporary field stations for market news work are financed by the aid of State or trade agencies and could not be operated without their contributions. Special cooperative services are conducted on particular crops, such as grapes in the Chautauqua-Erie grape belt.

This bureau furnished information and assisted in the conduct of the clearing house for northwestern prunes both in the Walla Walla district and at Boise, Idaho. Reports of f. o. b. prices and reports of car-lot movement, arrivals, etc., were furnished all members of the clearing house. A clearing house on grapes was operated by

the California Vineyardists Association and information was furnished by this bureau. The clearing-house plan has been extended this year to include a large number of tree fruits in addition to grapes.

During 1927 it was possible through local cooperation to open three new temporary offices, one for spring lettuce at Phoenix, Ariz.; one for winter lettuce at Phoenix, and one for vegetable crops at Belle Glade-Chosen, Fla. In the spring of 1928 a field station for Bermuda onions was opened for the first time at Farmersville, Tex. Largely because of the lack of local interest and local financial aid, the potato field station at Charleston, S. C., was not operated in 1927 or 1928, and the strawberry field station was not opened at Judsonia, Ark., in 1928.

A preliminary study has been made of truck receipts in New York and other large markets, as it is felt that arrivals by truck are becoming increasingly important and are having more and more effect on marketing conditions and prices. State marketing agencies in New York and New Jersey cooperated in this new project. Prices are being studied in relation to market supplies.

#### INSPECTION SERVICE ON FRUITS AND VEGETABLES

Both receiving and shipping point work has been conducted on the same basis as during the three previous years. While shipping-point inspections showed an increase of 17,290 cars, there was a decrease of 364 cars in receiving-point inspections.

#### RECEIVING-POINT INSPECTIONS

Branch offices were maintained at 40 important receiving markets, and inspections were made also at adjacent points from which requests were received. Altogether 32,430 commercial inspections were made, and in addition large quantities of products were inspected for the United States Navy and other Federal agencies, as well as for a number of steamship companies. Only 19 reinspections were requested, and in 10 of these the original report was sustained. Especial attention was given to inspections for arsenic-spray residue on export shipments. Chemical analyses were made of samples of fruit, and the export form certificate was not granted if the amount of arsenic exceeded 0.01 grain per pound of fruit. Satisfactory progress has been made in the adoption by



fruit growers of methods of washing fruit to remove the spray residue.

#### AMENDMENT TO RULES

In February, 1928, the rules were amended so as to make it possible to take care of some additional work in some of the larger markets which could be handled without additional expense. This amendment provided that any applicant who shall have paid for 500 or more car-load inspections in any one market within the period of one year immediately following the filing of a declaration of his intention to avail himself of this privilege shall receive a refund from the department at the rate of \$1.50 per carload for the first 500 cars, after which the fee for such applicant shall be \$2.50 per carload for the remainder of the year. A total of 15 firms signed the declaration of intention to avail themselves of this privilege, and it is believed that it will result in a large increase in the number of inspections in some of the markets.

#### AUCTION INSPECTIONS

The inspection of juice grapes sold at auction in Chicago continued. The agreement entered into with the United States Fruit Auction Co. was renewed, and a total of 830 cars was inspected. Both the buyers and the auction company expressed their approval of the service rendered by the Federal inspectors, who exercised great care in selecting samples that fairly represented the quality and condition of the cars from which the samples were taken. The written reports issued by the inspectors were of great value to the buyers, but the success of this new line of work can be attributed largely to the fact that the buyers had confidence in the integrity and neutrality of the Federal inspectors.

#### SHIPPING-POINT INSPECTIONS INCREASE

A total of 210,832 cars were inspected at shipping points, which represents a net increase over last year of 17,290 cars. California showed the greatest increase of any State which amounted to approximately 10,000 cars. Practically all shipping-point inspections are made under cooperative agreements. The service was maintained in 41 States, and covered approximately 60 commodities. Of the 210,832 cars inspected at shipping points, there were 264 reinspections made at receiving markets, of which 90

sustained the original inspection and 174 reversed it.

#### RESEARCH AND STANDARDIZATION

The use of national standards has increased from year to year, and at the present time the bureau has recommended standards for 38 fruits and vegetables. With some commodities such as grapes the trade requires separate standards for different types, so that 49 United States standards have been issued. The inspection of 243,262 cars of fruits and vegetables during the past year were made largely on the basis of the United States standards. Although accurate information is not available, it is estimated that approximately 60 per cent of the wholesale trading in fruits and vegetables is done on the basis of national standards.

Constant research is necessary to revise and improve the United States standards, so that they will conform to good commercial practice and be satisfactory to the trade. During the past fiscal year standards were promulgated for garlic and apricots. Apple export standards as applied to condition factors were also issued. Revisions were made in the standards for a number of other products. Standards have been issued for raw tomatoes delivered to canneries, and investigations made with a view to establishing grades for other cannery products. Practical studies have been made and reports prepared on the handling and marketing of potatoes, strawberries, and eastern grapes. Studies have been made also of the origin and distribution of important fruits and vegetables.

During the 1927 shipping season through the cooperation of the California Vineyardists Association the bureau obtained and assembled certain information not previously available regarding the marketing of California grapes. This information including daily interstate shipments by variety, points at which they were unloaded, and their primary destinations with daily unloads by classes in 29 markets and other similar data has been assembled in bulletin form for distribution to those interested in marketing grapes.

The bureau is conducting a general study of the apple industry in cooperation with many State agencies. A mimeographed report has been published giving the relative importance of commercial varieties and sources of carload supply on 41 important mar-



kets. A manuscript for a bulletin discussing the market supplies and prices of apples is about completed.

The bureau's foreign marketing specialist in London has continued rendering service to producers and exporters concerning the condition of United States fruits arriving in Europe and its relation to grading, packing, and shipping methods. A London circular was again issued biweekly and forwarded to European agents who distribute United States fruits, giving information and grades, inspection, movement, and prices in the United States. During the summer months the specialist has returned to the United States, where he has visited growers and shippers in producing districts and addressed meetings to discuss the foreign marketing problems.

#### STANDARD CONTAINER ACT

The work on standard containers was increased by the passage of the standard hamper and basket act on May 21, 1928. The new act provides specifications for hampers, round-stave baskets, and splint baskets. The passage of this act completes the scheme of standardization of wooden containers for fruits and vegetables with the exception of crates and boxes.

Both the standard container act and the standard hamper and basket act are administered largely through educational work with the manufacturers. Manufacturers submit samples and specifications of their products to the bureau for approval before they turn out their product. The work of testing sample containers has been extremely heavy. Of the 4,421 containers tested, 907 or 20 per cent were found to be nonstandard. Excellent cooperation has been received from the manufacturers in administering the provisions of these laws.

#### COLLECTION AND DISTRIBUTION OF 1918 EXCESS WOOL PROFITS

In view of the pendency of an excess wool profits case (*U. S. v. W. A. & J. Norris McFarland*) in the Supreme Court of the United States, action on other cases pending in Federal district courts was not urged. The McFarland case was argued before the Supreme Court on October 7 and 10, 1927. However, the Supreme Court, on October 17, 1927, revoked the writ of certiorari, thereby dismissing the case, on the ground that "the decision of this case does not require a decision

of the questions which are presented in the petition for certiorari because of which the writ was granted." This action failed to decide any of the legal questions relating to this work. Consequently, Congress granted a deficiency appropriation of \$2,500 in December for the prosecution of cases during the remainder of the fiscal year. It was not possible, however, to bring any pending case to trial, although one case was argued before the Federal court in Chicago on April 9, a brief was filed in one other case, and steps were taken toward expediting the trial of several cases in the coming fall.

#### PRODUCE AGENCY ACT

The produce agency act became effective July 1, 1927, but funds for its enforcement were not available until approximately January 1, 1928. Copies of Service and Regulatory Announcements No. 107, containing the law and the regulations, were given a wide distribution throughout the country. Health officers were advised as to their designation as one of the classes authorized to make produce agency act inspections, and were furnished with samples of applications for inspection and certificates.

During the fiscal year 92 complaints were filed under the act. Of these 12 were found to be joint accounts, or purchase and sales transactions not coming under the act and had to be dismissed. Of the 80 cases which did appear to come under the act, 62 had been closed at the end of the fiscal year, and 18 were still pending.

Of the 62 cases which have been closed 33 were made the subject of personal investigation, the rest being handled by correspondence. In 10 cases settlements were effected as a result of the activities of this office, the settlements involving either the entire amount due or balance due. Three cases have been sent to the office of the solicitor. One of these is in the hands of the United States district attorney at Los Angeles and it is understood will come up for trial sometime during the next six months.

#### LIVESTOCK, MEATS, AND WOOL DIVISION

C. V. WHALIN, *in charge*

Progress was made in the three fields of activity—research, service, and educational demonstrations.

The service activities embraced a nation-wide market news service which

made available to the public reliable and up-to-the-minute information on supplies, demand, and prices in the leading livestock, meat, and wool markets of the country and a meat-grading and meat-stamping service which makes it possible for meat purchasers of both large and small scale to buy standard-grade meats and meat products.

The research activities were centered largely on grade standardization, marketing methods and practices, and projects involving studies of supply, distribution, demand, and price as related to livestock and meats.

#### GRADE STANDARDIZATION

The grade-standardization program was carried on along the lines laid down in earlier years, the procedure being that of making investigations, formulating standards, and demonstrating their practicability and usefulness in the market place and on the farm and range. The division's work in this field of standardization has aroused nation-wide interest and has been one of the principal factors in making it possible to develop the present market news service.

#### LIVESTOCK AND MEATS

The investigational work in livestock and meat-grade standardization is conducted in close cooperation with the market news service and with the active assistance of the entire staff of that unit. The market news service in turn is dependent on the completed standards for the proper conduct of its work.

Much work was done in the way of revising, refining, and clarifying tentative standards already developed. Special attention was given to thus treating the grade standards for 5 classes of slaughter cattle and for 6 grades of vealers, 6 grades of slaughter calves, 6 grades of veal carcasses, and 6 grades of calf carcasses. Specifications for these standards were revised in keeping with criticisms and suggestions and they are now ready for formal promulgation as official United States standards. Work was done in revising the tentative standards for yearling beef. Work on standards for slaughter hogs and for slaughter sheep and lambs was conducted throughout the year. A large number of carcasses have already been measured and considerable data assembled for study.

Publications dealing with standardization matters constitute one of the important means of education used. A circular entitled "Market Classes and Grades of Calves and Vealers" was printed, and manuscripts entitled "Advantages of Grade Standards for Livestock and Meats" and "Market Classes and Grades of Dressed Veal and Calf Carcasses" were prepared. Work has continued on market classes and grades of hogs.

A series of colored posters illustrating class and grade standards has been begun. Photographs illustrating seven grades of slaughter steers have been selected and hand-colored for lithographing. A similar poster illustrating grades of slaughter cows is in preparation.

An outstanding feature of the extension program was a series of approximately 90 grading demonstrations conducted in 10 States. At most of the meetings the specialist in charge had considerable numbers of live animals and illustrated the standards by actually grading the animals before his audience, in all instances giving careful explanations. Numerous addresses were made at meetings of agricultural workers, vocational teachers, and others.

#### QUALITY OF MEAT STUDY

The study of the factors which make quality and palatability carried on in cooperation with the Bureau of Animal Industry and 16 State agricultural experiment stations was continued, and another 1,000 cattle and their carcasses were studied. They were graded first as feeders, later as slaughter cattle, and after slaughter the carcasses were graded. These cattle were fed by the State and Federal experiment stations, thus making it possible to work with cattle of known history. The cattle used included heifers and steers of different grades ranging in age from calves to 4 year olds. All ages and both sexes were graded according to the divisions' tentative standards. Besides the cattle approximately 400 slaughter lambs and their carcasses were graded. In addition to the grading of live animals and their carcasses various kinds and cuts of meat were physically and chemically analyzed and were then cooked and graded for color, flavor, tenderness, juiciness, and general palatability.

The results from grading 627 cattle, among them being purebreds, crossbreds, scrubs, and Brahmas, show



that the grading committee placed 97 per cent of the carcasses within the same grade as the one to which they had assigned the live animals from which the carcasses were obtained. This indicates that it is possible to grade live animals successfully and that the grade of the animal is indicative of the meat it will yield.

#### WOOL

A keener realization of the benefits of standards for wool grades is indicated by the increasing requests from wool-growers' associations, agricultural colleges and universities, and the State and extension workers for information concerning the division's standards. During the year 175 partial and 77 complete sets of the wool standards and 16 complete sets of the official wool-top standards were prepared. Many of the sets have been lent to universities, educational institutions, and county agents for use in educational work in the schools and in the field. Six sets of the official wool standards were sent to the Central Chamber of Commerce, Valparaiso, Chile, and a request for two sets has recently been received from Poland. Sets of the proposed international wool standards comprising 12 grades, based on the numerical system of nomenclature, have been sent to all parts of the world for exhibition purposes. An exhibit of wool and wool-top grades also is being prepared to be sent to Spain. The standardization of wool and top grades has provided a basis for working out improved methods of marketing wool and wool-top products.

#### MOHAIR

The demand for mohair standards continues, and it is anticipated that standards will be ready for promulgation during the coming year. A manuscript for a bulletin on the Angora goat and mohair industry has been prepared in cooperation with the Bureau of Animal Industry, the Forest Service, the Bureau of Standards, and the Bureau of Foreign and Domestic Commerce.

#### WOOL-SHRINKAGE RESEARCH

Investigations relative to the shrinkage of wool of different grades were continued, and a large number of test samples were scoured, and reports showing the grade and shrinkage of the samples were sent to those who

furnished them. In addition the division sorted, graded, and scoured 187 fleeces of wool received from the Utah Agricultural College and furnished the college with a report showing the percentages of each grade in the several fleeces and the shrinkage of each fleece. The results from these tests are expected to be of interest to wool growers and will be helpful in establishing a basis for estimating shrinkage of wools produced in different sections.

Further study as to the possible damaging effects on wool of pine-tar oil, which is used as a fly repellent in some sections, was conducted during the year. Two samples of wool in the grease (one fine and one medium) were treated with commercial pine-tar oil, and two like samples were treated with a refined pine-tar oil. These samples were allowed to remain under natural atmospheric conditions for a period of 90 days, after which the samples were scoured. It was found that considerable tar residue adhered to the wool in both samples and that the fibers in each case were badly discolored by the oil treatment.

#### HIDES AND SKINS

Surveys of existing conditions in the hide and skin industry with a view to developing standardized grades for hides and skins were continued. Several conferences have been held with leading representatives of the industries which use hides and skins and a tentative grade classification has been prepared and is being subjected to various tests to determine its practicability.

#### METHODS AND PRACTICES OF MARKETING

Research in this field was confined almost wholly to a study of direct buying of livestock, particularly hogs, by packers. There is much interest in this subject in view of the rapid changes taking place in marketing methods, and the bureau has the most complete information available as to the extent that different methods are being used. This information covering a period of five years has been summarized so as to show the number of hogs bought annually at public markets and direct by more than 300 individual slaughtering plants. The summary when ready for publication will show the growth of direct buying and the sections where it is practiced most extensively.



Among the important factors contributing to the changes taking place in livestock-marketing methods are the building of improved highways and the increasing use of motor trucks for transporting livestock. In order to visualize the importance of the new methods of transportation in connection with livestock marketing the division has collected and summarized for publication statistics showing the growth of the "drive-in" business at public markets. These statistics show that a very large proportion of the livestock marketed annually is being transported in motor trucks and that this proportion is rapidly increasing.

#### SUPPLY, DISTRIBUTION, DEMAND, AND PRICE STUDIES

The analysis and interpretation of the economic information assembled by the market-reporting staff has developed into one of the most important research activities. The results of these studies serve as the basis for the semiannual livestock outlook reports and for reviews and special reports dealing with the livestock and meat situation released at various intervals throughout the year.

Four studies in this field were inaugurated, as follows: (1) A study of the factors affecting beef-cattle prices; (2) a study of the factors affecting the seasonal and yearly supply of hogs for commercial slaughter; (3) a study of the relation of wholesale and retail prices of pork and lamb and hog prices; and (4) an analytical and interpretative study of economic conditions in the livestock industry during 1927. The results of the last study were summarized for publication as the fourth annual livestock review issued by the bureau and was published as Miscellaneous Publication No. 28.

#### STATISTICAL SECTION

Much of the basic statistical material used in the research work of the division is obtained in connection with the operation of the market news service. Compilations and tabulations for permanent records include the following: Daily livestock prices by 60 classes and grades at 22 markets; daily fresh-meat prices by 43 classes and grades at 4 markets; daily cured-meat prices by 10 classes and grades at 4 markets; weekly wool prices at Boston; computation of weekly, monthly, and yearly averages of the above, and typing and mimeographing them for permanent record and for distribution; actual daily receipts of cattle, calves, hogs, sheep, and

horses and mules at 18 markets; monthly gradings of meat by class for steamship companies and other Government and commercial concerns at 17 markets; and the gradings of Good, Choice, and Prime beef at 10 markets.

Compilations and tabulations for current publication include comprehensive data on receipts, slaughter, shipments, and prices of the various kinds of livestock, with comparisons and averages. In addition, a large volume of statistical work is regularly carried on in connection with the market-reporting service at the leading market centers—Chicago, Kansas City, Omaha, and St. Paul—where records are compiled showing the distribution of market receipts and stocker and feeder shipments of cattle and sheep by class, grade, weight, and State origin and destination.

#### PUREBRED LIVESTOCK PRICE SURVEY

The fourth annual purebred livestock sale price survey covering sales in 1927 was made, and the results were summarized in 18 separate reports. These reports were based on the selling prices of 30,490 beef cattle, 22,838 dairy cattle, 35,437 hogs, and 16,557 sheep, making a total of 105,322 purebred animals. The reports show that the trend of prices of purebred animals continues upward and that a stronger demand existed for breeding stock in 1927 than in 1926. Information of this kind based on actual reports of breeders and published annually tends to stabilize prices and keeps buyers and sellers informed as to prevailing values.

#### WOOL STATISTICS

The regular quarterly survey of wool stocks in the hands of dealers was continued throughout the year and was released jointly with the information collected by the United States Department of Commerce on stocks held by manufacturers.

The compilation of international wool statistics was given attention, and increasing interest is being manifested among the various organizations of wool dealers. A representative of the bureau made a trip to Europe to attend a conference of the international wool committee, which is endeavoring to work out plans for such statistics.

#### MARKET NEWS SERVICE

During the year 30 of the markets and wholesale meat-distributing cen-

ters of the country were served from branch offices located in Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Fort Worth, Indianapolis, Kansas City, Lancaster, Los Angeles, National Stock Yards, Ill., New York City, Ogden, Omaha, Pittsburgh, Philadelphia, Portland, Oreg., St. Joseph, St. Paul, Salt Lake City, San Francisco, and Wichita.

The livestock markets reported included those located in all the above cities (Philadelphia excluded) and the market at Jersey City, which is covered by the New York office. A supervised reporting service of limited character was conducted at Sioux City and Baltimore. Wholesale meat-market conditions and prices were reported at Boston, Chicago, Philadelphia, and New York City. Wool-market reports covered the Boston market.

Daily and with few exceptions, weekly telegraphic reports of the 30 markets were released and given dissemination by leased and commercial telegraph wires, the leading press associations, private-wire houses, ticker services, etc. Many regular and special reports also were prepared for metropolitan and country newspapers, the market press, agricultural and trade journals, financial institutions, and others. Radio-broadcasting stations were served by every office, and an extensive bulletin-board service was maintained at all the livestock markets reported. Daily and weekly mail reports were released from most offices.

Expansion and refinement of its radio market news service probably represent the outstanding accomplishment in increasing the dissemination of market information. This was done with little or no additional expense, as the broadcast stations gladly gave the fullest cooperation. A statement covering radio service is shown later under the Division of Information.

The dissemination of market news through the columns of metropolitan and country newspapers, the market press, and agricultural and trade journals was continued. All of the leading news-press associations extended their use of the market-news reports, and several hundred country newspapers took advantage of the weekly mail reports and in some instances requested telegraphic reports to be filed at their expense. Metropolitan papers with large circulation in rural districts and trade and agricultural papers devoted more space to the bureau reports.

The C. N. D. (commercial news dispatch) service conducted by the Western Union and the Postal Telegraph Companies continued to use the livestock reports in supplying patrons with livestock information. The C. N. D. reports are filed for telegraphic transmission at regular periods during market hours, the number of reports filed depending largely upon the size of the market and the requests for the service.

Although the market news has become available through the increased number of radio stations and through the press, only slight reduction has been possible in the number of individuals receiving its mimeographed reports. Approximately 4,745,000 copies of regular mimeographed reports were mailed to subscribers from all of the field offices.

#### ADVANCE AND MORNING ESTIMATES

Trade interests watch closely and attach great value to the advance and morning estimates of livestock receipts that are compiled as a part of the market-news service as it is conducted at the major livestock markets. This work requires the hearty cooperation of the railroads, since reports made by the carriers form the basic information for the reports.

The morning estimates of receipts for the current day are released at most markets about 6 a. m. Advance estimates for the following day are in most instances released from 11 a. m. to 12 o'clock noon and are based on railroad reports of livestock in transit and car orders. Since the advent of the radio the advance estimates have taken on added significance as a factor of much importance in effecting more orderly marketing, for prospective shippers now not only have the preceding day's market conditions to assist them in determining their immediate action, but those within a radius of some 200 miles of the market center have knowledge of the estimated supply on the market for the current day in addition to the early Government reports of the current day's market trend and the advance estimates of receipts for the following day to guide them in deciding whether to market or withhold their shipments.

#### MEAT GRADING AND STAMPING SERVICE

The division's meat-grading service was materially expanded during the year to meet the increasing demands



for the service, and almost 23,000,000 pounds of meat were graded and accepted for those using the service. This service is now available in 15 cities. While there has been an increasing demand for the service at all points, the greatest increases were made at New York and Chicago. A large part of this work is performed for other Government agencies. Other users are railroads and steamship lines, hotels, and hospitals. Approximately 8,325,000 pounds of meat were graded and accepted for the Shipping Board alone.

The beef grading and stamping experiment inaugurated May 2, 1927, was continued with very satisfactory results, and a total of 60,707 carcasses aggregating more than 33,000,000 pounds of beef was graded and stamped during the year. This was in addition to the meat graded as a part of the regular grading service, to which reference was made above. The experiment demonstrated the feasibility and practicability of a uniform system of grading fresh meats and that grade identification could be established by a relatively simple method of stamping. The practicability of the service having been demonstrated, it was decided to continue it after July 1, 1928, on a fee basis, or as an essential part of the meat-grading service, and practically all slaughterers at centers where graders are stationed have indicated a willingness to pay for the service.

### OPERATION OF CENTER MARKET

C. H. WALLEIGH, *superintendent*

The policy prevailing in previous years regarding the management and control of Center Market was continued. Owing to the fact that legislation is pending for the discontinuance of the market, only such repairs and alterations were made as were necessary to maintain satisfactory service. Financial reports were required from all stand holders within the market. These reports show gross sales, volume of business handled, and expenses incurred in its conduct.

### GRAIN DIVISION

H. J. BESLEY, *in charge*

The work of the grain division is divided into two parts: (1) Regulatory, enforcement of the United States grain standards act; and (2) standardization and marketing studies.

The enforcement of the grain standards act is directed from the Washington office and through general field headquarters at Chicago, including the board of review and the force in charge of inspection efficiency. Under direction of the general headquarters, Pacific coast headquarters are maintained at Portland, Oreg. There are four division supervisors and 34 district offices.

At the close of the year there were 132 regular inspection points and 24 additional points which were covered, and 459 licensed inspectors.

### CONTINUED GROWTH IN WORK UNDER GRAIN STANDARDS ACT

The steady increase in the reliance which the grain trade has placed on the application of the standards by the Federal supervisors has thrown a heavy burden upon the field offices. In addition to the increased requests for appeal certificates, numerous problems have arisen which made intensive supervision of the grading work imperative. Adverse weather conditions during harvest time and the increased use of the combine resulted in large quantities of damp wheat going into storage, which was followed by much "out-of-condition" wheat in the markets. Complaints involving several hundred thousand bushels of wheat were referred to the Secretary of Agriculture. Samples of the grain involved were submitted to groups of experts in five of the leading grain markets who, without exception, vindicated the position taken by the board of review.

Questions of musty, sour, sprouted, and heat-damaged wheat were involved at many points. An unusual amount of garlic was present at some points. Frost damage was severe in parts of the hard-red spring and durum districts. A great deal of personal attention was given by offices of the bureau to securing satisfactory grading of the grain in question and in bringing about a correct understanding of the factors involved.

The records for the year show a marked improvement in intermarket uniformity of grain inspections throughout the country. Both the percentage of shipments grading the same and grading the same or better, in both markets, showed improvement for all grains. The primary purpose of the passage of the United States grain standards act was to bring about uniformity in grain inspections throughout the country. The increase in in-



termarket uniformity of inspections since the act was passed has been very substantial.

#### CONTINUED INCREASE IN GRAIN APPEALS

Approximately 160,000,000 bushels of grain was graded and certificated by the department during the fiscal year 1928, as a result of appeals filed through the several offices of Federal grain supervision, appealing from the grades assigned by inspectors licensed under the United States grain standards act. A total of 80,618 lots was appealed, an increase of 32.4 per cent over the preceding year, and nearly 100 per cent more than was appealed during the fiscal year 1926.

The Duluth office led the offices in the total number of appeals handled, with 18,488. Chicago was next, with 14,436; Kansas City was third, with 13,552. A board appeal or superappeal was filed in 1,355 cases by parties dissatisfied with the district supervisor's grade. The fees and charges collected for the inspections amounted to \$97,356.79, which went to miscellaneous receipts.

#### MILLING AND BAKING STUDIES

The wet weather prevailing in the Southwest immediately after the harvest of the 1927 crop of wheat resulted in much of the shocked and stacked wheat having a questionable odor. In order to assist in the proper interpretation of the Federal standards (grades) with respect to this factor, a number of milling and baking tests were made on samples of wheat carrying questionable odors. In addition, milling and baking tests were made on samples of wheat for the Bureau of Plant Industry in connection with the development of new varieties having superior milling and baking qualities and for the Bureau of Chemistry and Soils in connection with their study of the effect on yield and quality of wheat of applications of sodium nitrate to the wheat plant in various quantities and at different stages of growth.

The study of world wheats, begun the previous year, was completed, and considerable progress was made in the preparation of the results for publication as a technical bulletin. This study involved milling, baking, and chemical tests on 900 commercial and varietal samples of wheats obtained from 38 different countries. The information resulting from this study should be of considerable value in con-

nection with the determination of the effect of world crop conditions upon the market value of our own wheats and as a basis for the most advantageous marketing of our surplus stocks of wheat.

The results of a study of the relationships existing between kernel texture, protein content, and test weight per bushel of hard red spring wheat, were published as an article in the *Journal of Agricultural Research* under the title "Correlation of Kernel Texture, Test Weight per Bushel, and Protein Content of Hard Red Spring Wheat." A similar study was made on hard red winter wheats, and considerable progress has been made in writing up the results for publication in the *Journal of Agricultural Research*.

Cooperation was extended to the Delaware, Indiana, and Kansas Agricultural Experiment Stations in the study of the milling and baking characteristics of certain wheat varieties.

#### CHEMICAL STUDIES OF GRAIN

A chemical study was made of the nature and kind of oil found in the garlic bulblets commonly found in soft red winter wheat. Special attention was paid to the question whether this oil retained its potency from the time of harvest until the bulblets became dry the following spring. The influence of garlic bulblets at different moisture contents upon the milling quality of wheat was studied. It was found that over long periods of time the oil remained pungent within the bulblets, only awaiting the presence of moisture to make them again as active as when freshly harvested. The results of the tests are of importance in connection with the proper interpretation of "garlicky wheat" in grading grain under the provisions of the grain standards act.

A comprehensive laboratory study was made of the quality and quantity of the gluten in wheats grown throughout the world in order to compare them with those grown in the United States.

Extensive research work was devoted to the out-of-condition wheat referred to in the grain trade as "sick" wheat. Laboratory studies of various sorts were made on this type of out-of-condition grain, and it was found that the only chemical constituent of the kernel of wheat which becomes altered in a pronounced manner so that it could be said that the kernel had been subjected to abnormal conditions was the fat in the kernel. This constituent be-

comes altered with the liberation of a large amount of free fatty acids. The amount of acids formed is in direct proportion to the amount of fermentation which the wheat has gone through. Studies were made comparing the development of acidity in the kernel with the milling and baking qualities of large numbers of "sick" wheat samples.

In cooperation with the Bureau of Plant Industry several hundred flax samples were analyzed for their oil content as an aid to the breeding of flaxseed varieties, and durum wheat samples for their carotin content.

#### DOCKAGE AND GRAIN CLEANING

The results of a survey of the dockage in wheat and flax delivered to country elevators in the four spring-wheat States show that dockage, so far as the farmers are concerned, has not decreased, but that the dockage in the grain received in the terminal markets from the spring-wheat area has decreased somewhat because of the increase in the practice of cleaning grain on the farm and at the country elevator. Demonstrations were made of new methods for cleaning grain, and considerable publicity was given to the advantage of cleaning grain on the farm. In the California rice belt many rice farmers installed on their threshing machines the grain-cleaning device known as the Bates aspirator, which was developed in the bureau. The rice that was cleaned with this device commanded a premium on the market and was also in better condition for seed purposes. A combination grain cleaner and copper-carbonate dust treater for seed grain was developed and assistance was rendered a group of farmers in California in the construction of the machine. The results of the operation of this machine were entirely satisfactory and stimulated other groups of farmers to install similar machines. In cooperation with a grain-cleaner manufacturer a grain cleaner was designed for attachment to a combine, and this machine will be tried out during the 1928 harvest season in the spring-wheat area.

#### RICE STANDARDS RECOMMENDED

During the past year United States grades for brown rice were prepared and recommended to the trade. A handbook was prepared in which the grades for rough rice, brown rice, and milled rice were incorporated. The

handbook contains also a description of proper methods for applying the grades, including a description of the apparatus needed for grading rice and the proper methods of use. Contact has been maintained with rice-inspection agencies and assistance was rendered in checking the work of the rice inspectors so as to insure the proper application of the grades for rice. A formal agreement was entered into with the Department of Agriculture of Texas whereby a rough-rice inspector at Beaumont, Tex., will be licensed under the food products inspection act. The inspector will use the United States grades for rough rice, and his work will be under the supervision of this bureau. Demonstration work was done which resulted in the rice trade gaining a better understanding of the Federal grades for rice and which has also resulted in the establishment of more rice-testing laboratories by rice millers and others.

#### GRAIN AND RICE HANDLING STUDIES

Investigations were conducted to determine the effect of combine harvesting on the quality and market value of grain. These investigations disclosed the fact that the combines were frequently harvesting grain before it was ripe, too soon after rains, and too early in the morning, with a result that such grain contained a high moisture content, which causes it to go out of condition in storage and during transportation, results in a lower grade when the grain is graded on the terminal market, and brings a reduced price. It was determined that the grain in the hard winter wheat belt is seldom dry enough for safety in combining until about 10 a. m., and that the grain in the spring wheat belt is seldom dry enough to combine until noon. In the spring wheat belt it was found that the weed seeds which are harvested with the grain are very high in moisture content, frequently testing up to 60 per cent moisture, and that to assure safety in storage the weed seeds must be cleaned out of the grain immediately after it is harvested.

Experiments with ventilated farm grain bins in the spring wheat area demonstrated that when the ventilators are properly constructed, open to the outside air at both ends and spaced close together in the bin, they will keep grain which contains a slight excess of moisture from going out of condition in storage, but may not prevent spoil-



age if the grain is immature or damp or if it contains green weed seeds.

Bulk-handling investigations on the Pacific coast were continued. As a result of the publicity that was given through bulletins, press stories, and illustrated lectures concerning the economy of bulk over the sack method of handling grain, many farmers in that section converted their sack-handling equipment, to bulk-handling equipment, and considerable additional bulk-handling equipment and storage was also installed and built at the country grain-buying points and at the terminal markets on the Pacific coast.

#### RICE-DRYING METHODS IMPROVED

Extensive investigations and experiments pertaining to artificial drying of rice were conducted both in the southern rice belt and in California. It was found that artificial rice drying as it is often performed commercially injures the milling quality of the rice. Experiments with improved methods of drying demonstrated that rice can be dried successfully so that its milling value will actually be materially improved. Because of the importance of this matter, wide publicity was given to the improved methods that were developed, with a result that the improved methods were generally adopted.

#### DIVISION OF DAIRY AND POULTRY PRODUCTS

ROY C. POTTS, *in charge*

##### RESEARCH PROJECTS

Research work of the division during the past year has centered on two main projects—the live-poultry market at New York City and the San Francisco wholesale butter and egg market.

The market analysis of the live-poultry industry of New York City has just been completed. This study includes a discussion of the sources of supply of live poultry shipped to New York and of the principal consumers of this commodity in the metropolitan New York area. Detailed analyses of costs of rendering the different services, from shipping point to slaughterhouse, have been made for those States which contribute the greater portion of live poultry coming to this market. The price-making mechanism is described, and the factors influencing price variations have been deter-

mined, and the relative influence of each of the more important price-determining factors has been measured. The report points out the potential advantages to be derived from a union terminal at which all live poultry consumed in New York might be concentrated preparatory to sale.

The study of the wholesale-price situation relating to butter and eggs on the Pacific coast was begun last fall and is well under way. A preliminary report to the trade, which has just been completed, is designed to point out the causes of discontent and to suggest methods of improvement.

Studies on rural per capita consumption of dairy and poultry products and of urban per capita consumption of milk and cream are well under way, and it is expected that the results will appear in published form early next year.

In cooperation with the New Jersey Agricultural Experiment Station a study of consumer habits and preferences relative to eggs in a number of typical New Jersey areas is under way. This study will be associated with a quantitative study of the elasticity of demand for eggs, the preliminary work for which has been completed.

##### EGG-GRADING SERVICE EXTENDED

Egg-grading services have been maintained during the year in New York, Philadelphia, San Francisco, and Chicago. This work has made advances both in volume of business handled and in its influence upon the egg trade in those markets. New egg-grading services have been established at Boston, Los Angeles, Washington, D. C., and Parkersburg, W. Va. The service at Los Angeles is a Federal-State service and is an expansion of the work previously undertaken with the State at San Francisco. The work at Parkersburg, W. Va., is a Federal-State service which was inaugurated primarily to furnish an egg-grading service for the new West Virginia State poultry demonstration marketing plant located at that point. An agreement was also signed with the State of Virginia providing for an egg-grading service.

Progress in the use of uniform egg grades is indicated by the action of a number of States which have established egg grades based in whole or in part upon the United States standards and grades for eggs. At present eight States (Wyoming, Massachusetts, Maine, Rhode Island, New York, Louisiana, Georgia, and California)



have such grades and others are contemplating similar action.

#### DRESSED-POULTRY STANDARDS ISSUED

Tentative United States standards and grades for dressed poultry were issued during the year. These have been reviewed at considerable length by members of the dressed-poultry trade and have met with approval in most respects. Some changes have been made as the result of criticism and suggestions received, and the standards and grades are now in shape for hearings to be held on them in the near future.

A grading service was undertaken in Washington as a means of testing out the grades in practical use. Poultry bought under these specifications and officially graded prior to delivery has proven very satisfactory to several institutions in the District of Columbia. An interesting application of this grading service was a sale by a chain-store organization of Christmas turkeys which had been officially graded and stamped "U. S. Prime." This grading and stamping apparently established consumer confidence, for the supply of turkeys handled by this chain had to be augmented while other chain-store supplies, not officially graded and stamped, were not cleaned up although sold at a lower price.

United States classes and subclasses for live poultry have also been issued in tentative form. These were put out in anticipation of the need for a basis for exchange trading. More definite grades for live poultry do not seem advisable at this time, but the United States classes and subclasses proposed will provide a basis for such grades when the need for them arises.

All live poultry arriving in New York is inspected for condition of health and for size of crop by inspectors licensed by this bureau and working under the close supervision of one of its representatives. This work is carried on in cooperation with the New York Live Poultry Commission Merchants' Association and the Greater New York Live Poultry Chamber of Commerce. During the calendar year 1927 over 12,000 cars of poultry were inspected in addition to large quantities of coop poultry arriving by express.

A very interesting new development of the year was the inauguration of an inspection service on dressed poultry and edible products thereof for condition and wholesomeness. This service

was first undertaken for a manufacturer of chicken soup for export to Canada, since without Federal inspection of the poultry used in its manufacture this soup could not be admitted to Canada. The Secretary of Agriculture promulgated rules and regulations and the work was begun in March, 1928. The work covers the complete inspection of each poultry carcass, all those found diseased or otherwise unfit for human food being condemned and destroyed.

Recently the Department of Health of the City of New York amended its regulations to require that, after August 1, 1928, all canned poultry sold in New York City shall have been inspected by an agency acceptable to it. Widespread use of this service may well be the means of establishing greater consumer confidence in canned poultry products and may lead to an increased total poultry consumption. The inspection itself is performed by qualified veterinarians, and the work is now carried on in cooperation with the two organizations which cooperate in the inspection of live poultry at New York.

#### BUTTER AND CHEESE GRADING

Grading services on butter were conducted during the year at New York, Chicago, Washington, Philadelphia, Boston, Minneapolis, Duluth, San Francisco, Los Angeles, and Bellingham, Wash., and on cheese at all of these points except Duluth and Bellingham.

Principal attention during the year has been given to promoting the efficiency of the work already established. Perfection of new systems of record keeping and closer following up of fee collections have been important steps taken. Also definite work has been directed toward closer maintenance of the same quality standards at all grading points.

At nearly all points the volume of work handled has increased. The total amount of butter graded during the fiscal year approximated 140,000,000 pounds, a larger quantity than ever before, and an amount representing about 10 per cent of the total production of creamery butter in the United States.

#### MARKET NEWS SERVICE

There are at least two distinct classes of users to be served with market information relating to commodities covered by the division, and while the scope of the service was not materially

expanded, such modifications were made from time to time as were needed to meet the demands of these two groups. The type of service demanded by dealers and distributors in the wholesale markets is first of all promptness, with considerable detail relating to conditions in certain important local markets. Storage reports have come to be regarded as more essential than ever before in the business of buying and selling. Future trading has also increased the interest in storage reports, with the result that effort is now being put forth to provide storage reports which are adequate. Daily and weekly reports covering a large number of the more important storage centers which have been issued over a period of several years now afford the means whereby estimates of total United States holdings may be made by the trade with a close degree of accuracy. Other reports which require promptness in order to meet trade demands are those relating to supplies, and the tone and price trend in important markets. This demand is being met so far as the most important national markets are concerned.

The second class of users of market reports includes creameries, cheese factories, jobbers, grocers, hotel and restaurant buyers, cream-station operators, producers, and others who need in a more general way to keep in touch with market-price information as an aid in checking buying or selling operations. Through its leased-wire service and mimeographed reports the bureau is aiding both of the groups mentioned.

Dairy and poultry trade papers are making extensive use of market reports, in many cases printing reports in full or in part, but also using freely the statistics shown in reports in the making of their own analyses of market conditions. The commercial press and radio also serve as further means of disseminating market information.

Market reports are prepared and released to local mailing lists from Washington, D. C., and eight field offices. The approximate number of names on these combined mailing lists is 20,000, and during the year approximately 5,500,000 mimeographed market reports were distributed. The greatest increase in demand during the year has been for the monthly review which covers all dairy products and summarizes the general dairy situation. There has also been an increased interest in

monthly estimates of butter production, which reports have been of added value this season on account of domestic production being lighter and more uncertain than might be expected.

Preliminary arrangements were inaugurated during the year for milk and cream market reports at Boston and Philadelphia, similar to the service already in operation at New York. The arrangements at Boston were not completed on account of traffic conditions having been so seriously interrupted during the fall of 1927 by floods in principal New England producing sections. These reports will begin with the calendar year 1929. At Philadelphia final arrangements will necessarily include reports from the local milk trade of the quantities of milk and cream received by auto truck. Arrivals by this means of transportation constitute an important part of the city's supply. At Chicago all of the preliminary contacts have been made for the inauguration of a live-poultry market-reporting service similar to the service at New York City.

California has been added to the list of States cooperating with the division in the collection and compilation of statistics on the production of manufactured dairy products. Through this type of cooperation with those agencies in the States which are familiar with local conditions and which furthermore are in many cases authorized by State law to collect information from manufacturers, improvement in dairy statistics should result.

### COLD-STORAGE REPORT SECTION

WM. BROXTON, *in charge*

During the current fiscal year a survey of refrigerated warehouse space was made, and the cold-storage bulletin was rewritten and brought up to date as of December 1, 1927. The tabulation showing the warehouse space will be published in the cold-storage bulletin.

There has been an increased demand for the information compiled by the section in the cold-storage report and also for the statistics of slaughter. Mailing lists have been increased, and a large number of special tabulations have been made for various organizations which are interested in using this information for research. Four trips have been made into the field, and several hundreds of the cooperating concerns have been visited for the purpose of bringing about closer relations.



## DIVISION OF HAY, FEED, AND SEED

W. A. WHEELER, *in charge*

### SEED-VERIFICATION SERVICE INAUGURATED

The seed-verification service, inaugurated in October, 1927, is meeting a need which has long been recognized by specialists of this bureau and by buyers of seed throughout the country. This service is carried on under the same legal authority as the various inspection services on farm products, maintained by the bureau, but it is unique in that the verification does not depend upon a physical examination but on the maintenance of a complete system of records by seedsmen, under the supervision of the Federal Department of Agriculture. The service gives to the buyer of seed which bears a verified-origin seed certificate assurance that the seed purchased by him was produced where stated in the certificate. The origin of every lot of seed covered by such a certificate may, through an examination by a Federal seed inspector of the records of the dealer offering such seed, be traced back to the place where the seed was produced. These records show what disposition is made of every pound of seed which is verified. An emblem in the form of a shield, with the words "Verified-origin seed" superimposed upon the letters "U. S.," was adopted for the use of the verified-origin dealers on letterheads, tags, advertisements, etc., which serves to identify these dealers from others not enrolled in the service.

The service was inaugurated on alfalfa, clover, and seed corn, but for the coming fiscal year it has been agreed to limit it to alfalfa, with the stipulation that all lots of this seed, so far as possible, will be verified as to origin. This service is based entirely on voluntary agreements entered into by the seed dealers with this department. The plan of the service lends itself to the verification of all kinds of seed, and it is expected that after the merits of verified-origin seed become better known other kinds of seed will be included in the service.

Sixty-one dealers in 24 States, who usually handle at least 85 per cent of the alfalfa and clover seed sold commercially in this country, enrolled in the service for the first season. Approximately 1,200 inspection certificates, representing nearly 10,000 lots of seed, were handled by six inspectors located in Chicago, Kansas City, Min-

neapolis, Salt Lake City, San Francisco, and Washington. The service was carefully supervised, and information gathered in producing districts, from retail dealers, and other sources, was used in checking the records of the verified-origin dealers. No instance of willful misrepresentation of the origin of seed on a verified-origin seed certificate has been found. This indicates a splendid spirit of cooperation, which is making the certificate a guarantee as to the reliability of the statement of origin contained therein.

### SEED REPORTING SERVICE

Four types of seed reports were issued throughout the year, namely, outlook, price and movement, shipment, and weekly seed reviews. In addition, reports on retail prices, a prospective-demand report, a retail-sales summary, and a special report on certified seed potatoes were issued. Special reports on vetch and ryegrass seed elicited favorable comment from far-Western growers. Contact with more than 100 foreign correspondents yielded valuable information, not otherwise obtainable, for the seed reports. Approximately 191,000 copies of mimeographed seed reports were issued, which were widely distributed among seed growers, consumers, and the trade.

### HAY STANDARDIZATION

Special attention has been given to providing information for producers, country shippers, distributors, and consumers of hay on the use of and benefits to be derived from the United States hay standards and the Federal hay-inspection service. Bulletins, articles, and press releases of a very practical nature have been prepared, which deal with the marketing of hay on Federal standards, how to purchase alfalfa for dairy feeding, the relation of the United States grades to feed value, etc. An educational campaign was organized among the producers of alfalfa, in order to furnish them with advice as to the best methods of producing and shipping alfalfa to obtain premium prices. Research work is being carried on in the bureau, and many laboratory tests are made of hay produced and handled under varying conditions. The Extension Service of the department and the State agricultural colleges and county agents in the leading hay-producing sections have assisted in this educational work. A marked increase has been noted in the number of livestock feeders who



are placing their orders for hay on the basis of the United States grades.

Important work has been done the past year in the development of new apparatus for measuring the color of hays. The objectives sought are a higher degree of accuracy and a simplification of the methods for determining the percentage of green color in hay. Apparatus has been devised which occupies much less space than the apparatus previously used and which makes use of artificial light, which provides light of equal intensity from day to day or at different times during any one day. The research work on methods and equipment accomplished the past year indicates the possibility of making color-measurement equipment available for use in colleges and supervisors' offices at much smaller expense and taking up less space than heretofore.

#### SOY-BEAN HAY STANDARDS

A cooperative agreement has been entered into with the Alabama Polytechnic Institute for the purpose of formulating United States standards for soy-bean hay. The Alabama college assembled soy-bean hay bales of different varieties and grades, which have been analyzed and studied in the division's laboratory at Washington. This work was organized at the request of the Alabama Farm Bureau Federation for the purpose of stimulating greater interest in this important forage crop in the Southern States. Several other Southern States have indicated their interest in this project and will cooperate in studying the assembled samples and data for the purpose of formulating the tentative standards.

#### HAY-GRADING DEMONSTRATIONS

In cooperation with various agencies, hay-grading demonstrations have been conducted in a number of the leading hay-producing States. Hay-judging contests were held under the supervision of this bureau at the Chicago International Livestock Show and at the Portland Livestock Exhibition. These practical demonstrations are very popular and serve as an excellent medium for the dissemination of information on hay grading. The demand for type samples of hay on the part of hay exchanges, hay inspectors, agricultural colleges, and others has increased greatly, and many hundreds of samples have been distributed from the laboratories in Washington and Kansas City.

#### MEASURING HAY IN STACKS AND MOWS

Ten of the important western hay-growing States cooperated with this bureau in obtaining data from the measurement of approximately 1,000 stacks of alfalfa and other hay, for the purpose of devising an accurate rule for determining the volume of hay in stacks and the number of cubic feet of hay necessary to make a ton under varying conditions. The work so far indicates the possibility of formulating more accurate volume rules than are now available, and it has been agreed to continue the work during the coming year. Large quantities of alfalfa, especially, are marketed in the stack, and accurate rules of this character are greatly needed. Livestock feeders and hay growers are displaying much interest in this project.

#### ALFALFA-MEAL STUDIES

In response to urgent requests from western alfalfa growers, study is being given to the formulation of standards for alfalfa meal. An item of \$5,000 was included by Congress in the appropriation act for the fiscal year 1929 for this purpose. Preliminary work has been done on assembling samples and in devising methods and equipment for determining moisture content. Study will be continued during the year on grade factors, such as color, moisture, fiber, and protein, and on the problems connected with the milling and shipping of alfalfa meal.

#### HAY INSPECTION SERVICE EXPANDED

The Federal hay-inspection service has expanded at a rapid rate. The total number of inspections made during the year was 29,343 as compared to 17,161 for the year ended June 30, 1927, or an increase of 71 per cent.

The outstanding development in the hay-inspection service was the addition of Kansas City to the list of markets making use of the service. Kansas City is the largest hay market in the United States, receiving from 25,000 to 30,000 cars annually, of which receipts 80 per cent is distributed to Southeastern and Eastern States. The inspection service at Kansas City, therefore, will have an influence in a large number of the important hay-producing and hay-purchasing States. Other developments of importance were the adoption of the United States hay standards as the official standards in the State of Alabama and the organization in that State of a manda-

tory Federal-State inspection service in the important market of Birmingham.

The Federal hay-inspection service is now operating in 16 terminal or reconsignment markets and at 19 shipping points. Licensed Federal inspectors are also stationed at 26 United States Army posts, where hay is received for the Army in considerable quantities. Federal-State hay-inspection agreements are in force in 6 States. The number of designated and licensed inspectors is 83, of whom 11 are employees of the United States Department of Agriculture engaged in supervisory or research work.

#### STANDARDS FOR BEANS AND SOY BEANS

Educational work has been carried on in cooperation with the American Wholesale Grocery Association and others to acquaint the trade with the advantages of buying beans on the basis of the United States standards and the United States inspection certificates. The number of shippers' and growers' organizations using this service is constantly increasing. Studies of the factors affecting the quality of beans in storage have been continued in cooperation with the Navy Department. This bureau cooperated with the Bureau of Plant Industry in a study of the efficiency of combines in the harvesting of soy beans. Special attention was given to the effect of this method upon the grade of the product under varying conditions.

#### INSPECTION OF BEANS AND SOY BEANS

The total number of cars of beans inspected was more than double that of the preceding year. The largest number of inspections and the greatest increase were in Idaho and Colorado, where it was necessary to train and license additional inspectors. The service was inaugurated under cooperative agreements with trade exchanges at New York City and Houston, Tex., and negotiations were entered into for inaugurating the service at Toledo, Ohio, and New Orleans, La. The number of inspections made for the Navy and Marine Corps increased also, and substantial savings to those departments were effected. The total number of inspections of soy beans showed a decrease for the year, but the number of inspections at certain points increased. The inspection service was extended to include Peoria, Ill.

#### GRAIN, HAY, AND FEED MARKET NEWS SERVICE

The demand for the extension of the grain, hay, and feed news service to additional areas was partly met by a wider distribution of the weekly and special market reviews. Requests for the reviews were received in larger numbers from individual farmers and others, but distribution continued to be effected principally through the press, by radio, in market reports of State agencies, and upon bulletin boards of banks and cooperative associations. The dissemination of the grain-market reviews is now nationwide. The hay and feed reviews are distributed through most of the territory east of the Rocky Mountains. Distribution of special feed-market information has been obtained through cooperation with State marketing agencies in Wisconsin, Minnesota, the principal New England States, and Alabama.

Particular attention was given to making the information more definitely applicable to specific sections of the country. This was accomplished to a large extent by special reports, prepared at pivotal periods during the marketing season. Such reports were issued upon the market situation for durum wheat, rye, flax, barley, feed grains, soft winter wheat, linseed meal, cottonseed meal, wheat feeds, alfalfa meal, and hay. Monthly and quarterly reviews were issued regularly covering the general market situation for grain, hay, and feed more comprehensively than was possible in the weekly reviews. The wheat-protein price service inaugurated in the Minneapolis office chiefly for the Montana State College of Agriculture has been extended to other areas in the Northwestern States.

Progress was made in the development of a statistical foundation for the principal grains and feeds for use in the evaluation of current statistical data and the analysis of current market developments. This involved critical study of the various available market statistics to determine reliability and comparability. With this background it was possible to increase materially the effectiveness of the service and to enlarge the scope of the weekly and special reviews and make them of much greater value to the farmers.

#### BROOMCORN NEWS SERVICE AND INSPECTION

The inspection and market news service on broomcorn was carried on



during the crop season. Owing to the short crop of broomcorn in 1927 the crop moved quickly at good prices, and there was less demand for inspections. The market news service was placed more definitely upon a statistical basis, and a definite release date, Tuesday of each week, was adopted for the weekly reviews which will be issued regularly from Kansas City instead of from local shipping points. Through a cooperative arrangement with the State Market Commission of Oklahoma a better distribution of the reports to farmers of that State was made possible.

### ADMINISTRATION OF THE UNITED STATES WAREHOUSE ACT

H. S. YOHE, *in charge*

The outstanding developments under the United States warehouse act during the year were the drafting of tentative standards for canned vegetables; a specific demonstration of the value of the standard tobacco grades to the farmer; clearer definition of disinterested custodianship of warehoused products; the promulgation of regulations for the storage of cold-pack fruit under the warehouse act, and a tremendous increase in the licensed cotton storage capacity.

The commodities now eligible for warehousing under the act are cotton, grain, wool, tobacco, peanuts, broomcorn, beans, potatoes, sirup, dried fruit, canned foods, cottonseed, and cold-pack fruit.

#### STANDARDS FOR CANNED FOODS ISSUED

Under authority of the warehouse act, and in answer to specific requests from the trade, tentative standards have been formulated for canned peas, corn, and tomatoes, and drafts of standards for canned beets, stringless or snap beans, and spinach are nearly completed. In these studies the bureau had the benefit of suggestion, counsel, and experiences of various canners, State canners' associations, the standardization committee of the National Canners' Association, and those engaged in governmental purchasing of canned foods or in enforcing laws pertaining to canned foods. Many of the canners in two of the largest vegetable-canning States of the country propose to pack and market their products on the basis of these standards, in the hope that the consumers will ultimately purchase according to these United States standards.

Not only will these standards serve in the marketing of the products, but they perform an important function in financing the canner. Canned foods stored in warehouses operating under authority of the Federal warehouse act will be covered by warehouse receipts which will state the grade of the products. Bankers who finance canners are manifesting a keen interest in the standards, because they afford a more definite means of determining the value of the product upon which loans can safely be made.

#### TOBACCO STANDARDIZATION

An interesting demonstration of the value to the farmer of the grades developed by the department for tobacco was made at Lynchburg, Va., by the State department of markets. Arrangements were made to grade the tobacco of farmers who desired the service as it was delivered by them at the warehouse. The grading was performed by a State employee in accordance with the Federal standards. The department instructed the State man in the use of the standards and then at various times checked his work to see that the standards were correctly applied and to see just how the standards worked in commercial practice. This demonstration afforded an excellent opportunity to test the practicability of the standards. It also served as a means to impress upon the farmers the need for proper sorting and preparing of tobacco for marketing purposes.

#### DISINTERESTED CUSTODIANSHIP OF STORED PRODUCTS

One of the first principles to be observed in connection with the financing of commodities while in storage is disinterested custodianship of the product. This principle was early announced in Federal Reserve Board regulations, and leading bankers have repeatedly referred to it. In administering the warehouse act, for the past four or five years, this fundamental principle has been called to the attention of persons desiring to avail themselves of this law, in all cases where it was apparent that the proposed plan of warehousing would not conform to this principle. Because so many plans have been presented to the department which did not comply with the principle, a concrete attempt has been made to offer definite suggestions as a guide to those contemplating using the Federal ware-



house act. These suggestions have been adopted by some leading banks, and the same principle is being applied to commodities other than agricultural. It should be noted that any one seeking credit who is prepared to offer a federally licensed warehouse receipt as collateral which has back of it disinterested custodianship will experience little difficulty.

#### COLD-PACK FRUIT REGULATIONS

During the past four or five years a number of requests have been received from packers of fruits and from bankers to place cold-pack fruit on the eligible list for storage under authority of the United States warehouse act. On May 26, 1928, regulations for the storage of such commodities were promulgated. Under the regulations cold-pack fruit is defined to mean:

The clean, sound product obtained by packing under certain minimum specifications, in suitable containers, properly matured and prepared fresh fruit and berries, with or without the addition of sugar (sucrose), and by maintaining it at a temperature sufficiently low to insure its preservation.

Because of past experiences it was felt necessary to embody in the regulations certain requirements and restrictions which were new to the packers and handlers of this product. Effort was made, however, to be as liberal as possible without impairing the collateral value of the warehouse receipts. While the regulations in comparison to trade custom may seem drastic, they have been formulated with a view to protecting the storer, the warehouseman, and the holder of the warehouse receipt.

#### ADDITIONAL COTTON WAREHOUSES LICENSED

Each year since 1920 has witnessed an increase in the licensed capacity for the storage of cotton. On June 1, 1928, the largest capacity was licensed that has been licensed at any one time since the passage of the act. On that date more than 835,000 bales capacity was added to the licensed storage space, making the total licensed capacity for the storage of cotton in excess of 3,435,000 bales. Since that date additional cotton warehouses have been licensed, with the result that there is to-day more federally licensed cotton storage than at any previous date in the history of the Federal warehouse act. It is estimated that more than 50 per cent of the entire cotton pro-

duction of the country will pass through these warehouses.

#### DIVISION OF STATISTICAL AND HISTORICAL RESEARCH

O. C. STINE, *in charge*

The Division of Statistical and Historical Research has continued collecting information and analyzing problems to provide farmers with information useful in deciding what to produce and when to market their products, and to provide the public with information useful in working out national agricultural policies. The most important accomplishments in the past year have been the collection of more extensive information as to crop and market conditions in the Orient, the production and movement of vegetables from Mexico, and market prospects in continental Europe; and the construction of index numbers of prices of commodities which farmers purchase. Progress has been made in price analysis and in the use of the results of price analysis in production and market-outlook statements.

#### FOREIGN COMPETITION AND DEMAND

Foreign agricultural production continues to expand and competition in the foreign markets for most of our agricultural products is becoming keener. Owing to increased foreign competition and, in the case of a few commodities, to reduced production in the United States, agricultural exports for the 1927-28 season have fallen below the exports of the 1926-27 season. Imports of agricultural products that compete with the products grown in this country also were somewhat smaller than last year. The outlook at the beginning of the new year is for a continuation of the tendency to increase foreign agricultural production and to reduce foreign demand for the agricultural products of the United States.

The hog producers of the United States probably have suffered more than any other producers in the past year from foreign competition. The recovery of hog production in Germany and the expansion of production in the Netherlands, Denmark, and Ireland greatly reduced the demand for pork and pork products from the United States. The situation has been carefully studied. It has been found that there are cycles of hog production in northern Europe similar to the cycles of production in the United

States. Methods for predicting the cycles in European production as well as in the production of the United States are being worked out. An analysis of the situation indicates that the European demand for pork products from the United States next year probably will be greater than last year, largely because of a reduction in the production of pork. It is clear, however, that the European demand for American pork during the next 5 or 10 years is not likely to be so great as it has been in the past 5 years.

The foreign demand for American cotton of the crop of 1927 was weakened by large exports from the crop of 1926. Domestic exports in the season August, 1927, to July, 1928, amounted to only 7,900,000 bales, as compared with 11,300,000 bales last year. The demand, however, has been greater than indicated by the volume of exports, and the declared valuation of the exports has been nearly equal to that of the previous season. Through the offices of the agricultural commissioner at Berlin and of the agricultural commissioner in the Orient the conditions of foreign textile industries and the demand for cotton in continental Europe and the Orient have been reviewed monthly. According to these reviews, American cotton was consumed at a high rate in many foreign countries during the first half of the season. In the latter half of the season there has been some slackening in consumption of raw cotton and in the demand for cotton goods. The high rate of consumption in the early part of the season, however, together with smaller shipments from the United States, has greatly reduced the foreign stocks of American cotton. Notwithstanding the slackening in consumption, therefore, prospects as to the foreign demand for American cotton at the end of the 1927-28 season are better than at the end of the 1926-27 season.

Civil war in China has disturbed the marketing of tobacco, but the outlook is improving. According to the agricultural commissioner, the cigarette business in China is probably in better condition and looks more promising than at any time during the past year and a half. Improvement in transportation in the heavy-consuming Provinces largely accounts for the restoration of the cigarette business.

Improvement in transportation and stabilization of conditions in China may result in increased exports of

eggs, walnuts, peanuts, and several other commodities. Through the agricultural commissioner, with the aid of the consuls, producers in the United States are being kept informed of developments and prospects as to the shipments from China of agricultural products that compete with the products of the United States, and the producers of agricultural products which we export to China are being kept informed as to marketing prospects.

The European demand for citrus fruit from the United States was somewhat better than last year. An increased volume of oranges and grapefruit was marketed in Great Britain. The first direct shipments were made from Florida to the British market. The fruit-marketing specialist of the bureau is aiding in the development of the market for these fruits in Great Britain by keeping producers and shippers informed of market conditions, by informing shippers of the condition of the fruit upon arrival and by taking advantage of every opportunity to stimulate the demand for these fruits.

The marketing of apples in Europe also has been facilitated by information as to marketing conditions and by advice as to the best methods of handling and shipping the fruit. Two cases of special interest may be cited from the past year's experience:

One incident was the arrival on European markets of considerable quantities of high-quality, low-priced Russian Crimean apples. Trade reports from foreign markets concerning the volume of Crimean shipments, their quality and low prices, alarmed some of the American producers shipping to these markets. The Department of Agriculture specialist, however, immediately cabled that the Yellow Newtown variety of the United States was most directly concerned, but that there was no necessity for any uneasiness, as the available volume of Crimean apples was limited and that the Russian shipments would end by the last of December following the last Crimean apple auction and before large-volume shipments of our Yellow Newtowns ordinarily arrive on European markets.

Another observation of special interest was that early in the season large quantities of barreled apples from the United States were arriving in poor condition, with much overripe fruit and slight decay, and prices obtained were reduced accordingly. In



the first week in January, however, the specialist noted that apples from the same orchards were arriving in excellent condition. The specialist immediately recognized that the later shipments were coming out of cold storage, and therefore advised that next season all apples in the early-season shipments should be precooled. The carrying out of this advice would mean big gains to the American apple producers next season.

The imports of fresh vegetables from Mexico in the winter and early spring are becoming an increasingly important factor in the fresh-vegetable markets of the United States. Shipments of vegetables from the west coast of Mexico to the United States increased from 1,000 cars in the 1920-21 season to almost 6,000 cars in the 1926-27 season. With the aid of the Consular Service a reporting service was inaugurated to keep producers in the United States informed of the conditions of the crops on the west coast of Mexico and of the volume of shipments. Producers and consumers in the United States were kept informed throughout the season of shipments and prospects for shipments in order that they might adjust production and marketing of the early vegetables produced in the United States for market in the period from November to June, in view of the competition from Mexico. Arrangements have also been made to secure similar reports from consular offices in Cuba, Bermuda, and the Bahama Islands. These reports, together with those on the Mexican west coast, provide a well-rounded service on the foreign competition of early vegetables.

The world's 1927 wheat crop amounted to 3,539,000,000 bushels, as compared with the 3,421,000,000 bushels produced in 1926. A comprehensive statistical survey of the wheat situation was issued monthly throughout the year. Early in the season, as it became evident that the crop would be as large or larger than the preceding crop, world market prices declined. Analyzing the situation, this bureau pointed out that while the world's wheat crop was somewhat larger than last year, the prices for the year should average close to those of the previous season because the European rye and potato crops were small, and the world's feed-grain supplies were so short as to result in higher prices which would increase the demand for wheat. Furthermore, it was pointed

out that the poor quality of the crops of Canada, France, and Germany would offset to some extent the increase in supplies. The differences in the situations in the marketing of the different classes of wheat were recognized. It was pointed out that the foreign production of durum was larger than last year and, therefore, the foreign demand for this wheat would probably be weaker. Producers of soft red winter wheat were told that the supplies would scarcely be sufficient for domestic requirements and that the market for this wheat would probably be above the world market level for a part of the year at least.

The farm price of all wheat for the marketing season averaged about \$1.22 per bushel, as compared with \$1.23 for the 1926-27 season. The price of durum declined early in the season and remained low, No. 2 amber durum at Minneapolis averaging \$1.53 in July and at the end of the season in June averaging only \$1.31 per bushel; soft red winter wheat rose to high levels toward the end of the season, No. 2 red at St. Louis rising from the July average of \$1.41 to an average of \$1.96 in May. Correspondents have indicated that at least some producers of durum wheat profited by the analyses of the durum wheat situation by selling early in the season. Many of the soft red winter wheat producers would have profited greatly by holding a part or all of their wheat until the latter part of the season.

Research to provide a basis for increasing the accuracy of early estimates of wheat production in foreign countries has been continued. In 1927 the Argentine crop was estimated accurately about a month before the Argentine official estimate was published. Preliminary studies indicate that it will be possible to estimate the Australian and Canadian crops fairly accurately before the official reports are made.

#### LONDON OFFICE

An outstanding contribution of the London office of the bureau during the past year was a statement covering the British economic situation as it affected the demand for American agricultural products for use in the preparation of the 1928 outlook report. This statement dealt comprehensively with the present and probable future British demand for such staple commodities as cotton, tobacco, and grain,



as well as for numerous minor products.

Cabled reports on the London wool sales and on the Mediterranean almond situation were particularly valuable. The wool cables covered regularly the prices, activity, and general tone of the London sales, which have an important bearing on world wool prices and consequently upon prices of wool in the United States. The reports on almonds covered the production and price situation in the Mediterranean producing countries and were of value to United States almond growers. A foreign-service release of the bureau, based on reports from the agricultural commissioner in London after a tour of the Mediterranean almond-growing countries, was reissued by the California Almond Growers Exchange and sent to all of its members.

#### BERLIN OFFICE

During the past year the Berlin office of the bureau has submitted regular monthly reports on the continental European demand situation in respect to cotton, wheat, tobacco, and apples. Monthly reports on the economic conditions in continental Europe as they affect the demand for American agricultural products have also been received from Berlin. A particularly valuable feature of this reporting service has consisted of the supplementary cables which arrive at about the same time as the written reports and bring the information in the latter up to the latest possible date.

An excellent example of the service rendered by the Berlin office may be found in the work on prunes. The principal competition encountered by American prunes in foreign markets comes from Yugoslavia. Reports from Berlin have kept American prune producers and exporters reliably informed on the prospects for shipment of Yugoslav prunes to competitive markets. This service is now being supplemented by cabled reports on the market situation in Hamburg, the leading European market for both American and Yugoslav prunes.

#### THE ORIENT

A good foundation has been laid for a reporting service on agricultural products in the Orient. The United States agricultural commissioner in that area forwarded a number of basic reports covering the oriental markets

for American agricultural products and on the production and marketing of certain oriental products that compete in our domestic markets. Several reports dealt with the factors affecting the demand for American wheat and wheat flour in China and Japan. A regular monthly reporting service has been arranged, with the cooperation of the United States Consular Service in China and Japan, to keep American wheat producers and exporters posted on the demand situation in the oriental markets. The service consists of cabled reports from Shanghai, Tientsin, Dairen, Harbin, and Tokyo, covering the prices of wheat and wheat flour in these markets, the imports from the several competing countries, and such other factors as affect or reflect the market situation in relation to American wheat and flour imports. Estimates of the condition and probable yield of wheat in Japan and China will be included as the information becomes available.

Reports were received from the agricultural commissioner also on the oriental markets for cotton and tobacco. In view of the fact that Japan is the third largest market for American cotton and China one of the largest markets for American tobacco, it is important to have prompt information on the demand situation in those markets. Arrangements are being made to secure this information each month by cable or radio.

Regular monthly radio reports were received during the past season on the shipment of Chinese peanuts to the United States and the peanut market situation in China. Arrangements have been made for timely cabled reports on the prospects for the Chinese walnut crop and the shipment of walnuts to the United States. Written and cabled reports were received also on a number of miscellaneous products such as soy beans, rice, and egg products.

#### PRICE INDEX NUMBERS

With the cooperation of other divisions of the bureau, new index numbers of prices paid by farmers for what they buy have been constructed. These index numbers show changes in prices since 1910 of commodities purchased by farmers for the family living and for operating the farm. They are constructed with the same base and as nearly as possible in the same manner as the indices of prices received for farm products.

The ratio of the index number of prices received for products sold to the index number of prices paid for commodities farmers purchase will hereafter be used instead of the ratio of farm prices to nonagricultural wholesale prices as a measure of the purchasing power of farm products.

The level of prices paid by farmers reached the highest point in 1919 and 1920, when it was 206 per cent of the pre-war level. Prices then declined until January, 1923, when the level of prices was only 150 per cent of the pre-war price level. Prices paid by farmers reached their highest post-war level in 1925, when they were 159 per cent of the pre-war level. Since 1925 the level of prices paid by farmers has declined slightly to 154 per cent of the pre-war level in 1927 and recently advanced to 156 in June, 1928. The advance in feed prices during the spring of 1928 was largely responsible for the rise in the level of prices paid by farmers.

Prices of commodities farmers purchased for use in production were lower than prices of commodities used for the family living. The June prices of commodities used in production were 148 per cent of the pre-war average, while the prices of commodities used for the family living were 162 per cent. The relatively low prices of feedstuffs and fertilizer held down the average prices of commodities used in production. Farm wages, however, are relatively high, being 170 in June, and combining wages paid to hired labor and prices paid for commodities raises the index of the cost of these factors in production to 153. The expensive items used by the family are clothing, house furnishings, and building materials. Furniture and furnishings are still about 200 per cent of pre-war prices, clothing 180, and building materials 170. Food prices, on the other hand, are relatively low.

The index of farm prices received by producers for their major products has been continued as in the preceding season. For the 1927-28 season it registered a considerable advance, rising from 130 in July, 1927, to 148 in May, 1928, and to 145 in July, 1928. This advance was due largely to advances in cotton and cattle prices during the first part of the season and to rapidly advancing cattle, hog, and grain prices toward the end of the season. The decline after May was due to considerable declines in wheat, fruit, and vegetable crops. The out-

standing features in agricultural prices during the past season were as follows: The rise in cattle prices on the upward side of the cattle price cycle; the decline in hog prices, which reached their low points around December and January, and a subsequent marked advance apparently on the upward side of another hog-price cycle; a marked advance in grain prices in April and May, due to poor crop prospects, and a subsequent decline due to improvement in crop conditions in the United States and other countries; and further declines in potato prices to pre-war levels, due to the heavy markets from the 1927 good-sized crop and prospects for a very large crop in 1928.

Largely as a result of this advance in the general average of farm prices the power of farm products to purchase commodities the farmer buys improved materially in the past year. The rise in farm prices from 130 at the beginning of the season to 145 at the end was accompanied by a change in the new index of retail prices paid by farmers for commodities bought in June from 155 in June, 1927, to 156 in June, 1928, indicating a relative purchasing power of farm products of 84 per cent of the pre-war purchasing power in June, 1927, and of 93 per cent in June, 1928. However, a good part of this advance in the buying power of the farmers' price per unit was offset by the fact that farmers sold fewer units of such commodities as cattle and cotton.

#### AGRICULTURAL INCOME

Research aiming at improvement and expansion of the statistical estimates of agricultural income has been continued. In cooperation with other divisions of the bureau, considerable progress has been made toward estimating annually agricultural income by States, on the same basis as that of the United States.

The agricultural income of the United States for the 1927-28 season was somewhat better than for the 1926-27 season, but not quite equal to that of the 1925-26 season, which was the best since the beginning of the depression. Gross income increased about 1 per cent, and expenses remained about the same, resulting in an increase of about 7 per cent in net income available for all capital employed in agriculture and to pay farmers for managing the industry. The average income available for



capital, labor, and management per farm family increased from \$862 to \$886. It is estimated that the rate of return earned on the current value of agricultural capital increased from 4.3 to 4.6 per cent, as compared with 5.2 per cent for 1925-26, which was the highest rate earned since the beginning of the depression.

It is to be observed also that the current value of agricultural capital increased for the first time since the depression. The current value of agricultural capital at the end of the 1928 season is estimated at \$58,431,000,000, as compared with \$58,299,000,000 at the end of the previous season. This increase, however, is due to an increase in the value of livestock, offsetting a small decline in the valuation of real estate.

#### PRICE ANALYSIS

Price analysis as a basis for formation of policies with reference to the production and marketing of agricultural products has continued along several lines. In the past year most attention has been given to cotton. The marked decline in prices beginning early in September focused attention upon the cotton situation. A thorough analysis of supply and demand conditions early in September indicated that the average price for the season of spot Middling cotton at New Orleans would be a little less than 20 cents per pound, and the price averaged 19.98. A test of the possibility of accurately analyzing conditions with reference to cotton as a basis for planning production has been made with reference to the acreage of cotton for the 1928 crop. By using methods developed for estimating changes in acreage in January it was conservatively estimated that the 1928 acreage would be 10 per cent greater than the 1927 acreage. The actual estimated increase as of July 1 was 11.4 per cent.

Some progress has been made in analyzing fruit prices. Data have been collected in New York and Boston to determine the trend of the demand for apples and for several different varieties of apples. A study has been made of the relation of prices of boxed apples to those of barreled apples and of the effect of foreign demand upon prices. It has been generally known that the annual variations in the prices of apples in the United States have been due largely to variations in the total apple crop

of the United States. The analyses carried on so far supply a method of measuring quantitatively the effect in cents per bushel on the price received by producers caused by specific variations in supply. A study of monthly prices has brought out the fact that the course of prices received by producers for the country as a whole is generally upward after September or October, and that the extent of the rise is considerable or moderate, depending on whether prices around September are much or only slightly below the average level for the year.

Preliminary studies have also been made of factors determining the yearly average prices received by producers of peaches, cranberries, and potatoes. In the case of the last two commodities, as in the case of apples, the size of the crop is the dominant cause of the yearly price variations, and the studies developed so far make it possible to measure the amount of price change that may be expected as a result of a specific change in the size of the crop.

A thorough analysis is being made of corn prices. The object is not only to determine what factors affect the prices but to obtain a measure of the influence of each of the factors annually and monthly. A preliminary report of the research in analyzing corn prices will be available for publication within the next year. It will show, among other things, that the price of corn is determined not only by the size of the corn crop but also by the number of animals to be fed and the production of oats and barley.

#### TRANSPORTATION

In the past year major emphasis in transportation research has been given to the preparation of material requested by farmers' organizations and others engaged in presenting transportation problems before the Interstate Commerce Commission. A preliminary study has been made of the transportation of cotton, and an index number of cotton freight rates has been constructed for the period 1910 to date. Plans have been made for more extensive research as to the relation of freight rates to the marketing and production of farm products.

#### HISTORICAL RESEARCH

Historical research continues to be directed toward the collection of information for use in the analysis of causes of shifts and changes in agricultural production and income.



Research to develop a long-time series of farm prices in Virginia and Maryland has been continued in cooperation with the State experiment stations of the respective States. The bulletin containing Maryland prices from 1850 to date, together with analysis of these prices, is about ready for publication. From Virginia records, prices have been obtained for some commodities annually and monthly from 1801 to 1927. A satisfactory series of prices has been obtained for some products, such as tobacco, for which price data have been almost completely lacking. Auction-sale prices of dark fire-cured tobacco, monthly, have been compiled for 100 years—1827 to 1927. An index number of prices farmers received in Virginia is being constructed. The several price series will be published by the Virginia Agricultural Experiment Station.

## DIVISION OF AGRICULTURAL FINANCE

NILS A. OLSEN, *in charge*

### RURAL CREDIT

The work in rural credit has included analysis of the farm-credit data obtained from studies conducted in cooperation with the agricultural colleges of North Carolina, South Carolina, Georgia, Arkansas, and Oklahoma. These studies bring out current credit conditions and show the relation of the amount and terms of borrowed funds to the source and purpose of credit on the one hand and to the type of farm organization on the other. Studies in three local areas in Arkansas reveal, for example, wide differences in the farm-mortgage interest rates being paid by farmers in the same community and indicate that many farmers could materially reduce the cost of their mortgage credit by availing themselves of the facilities of the Federal farm loan system or other similarly favorable loan plans. In numerous cases the rates now paid are double the most favorable rates in force on other farms.

Analyses of the short-term credit operations of the farmers in North Carolina, South Carolina, and Georgia showed that here again the chief differences in credit cost are due to the source of credit. Merchant credit averaged 27 per cent a year, as against 9 per cent for that of banks and credit corporations. Save in those cases where local cash-credit facilities are inadequate, the farmer can reduce the

cost of short-term credit by qualifying for lines of credit with cash lenders. Analyzed by purpose of credit, it clearly appears that the item of fertilizer was much the most costly from a credit standpoint, both with respect to total outlay and the rate paid. A study of livestock credit in Montana was completed also during the year in cooperation with the State Agricultural College of Montana.

A study directed to the determination of the factors affecting credit costs to farmers in the Southeastern States mentioned indicated that the items of net worth of the farmer and value of production per acre were most closely related to the cost of the credit used. The degree of the farmer's self-sufficiency, percentage of production from livestock, and amount of short-term credit borrowed appeared to have much influence on the rate charged. Inquiry into the operations of agricultural credit corporations in some local areas revealed a tendency for these agencies to appear in emergencies to supplement loan facilities of existing agencies and to disappear or decline in importance when the principal period of stress had passed. A striking feature disclosed in all the State studies referred to was the almost total absence of any other investment by farmers save that in the form of land and farm stock and equipment.

During the year the division entered upon a comprehensive project to determine the total farm-mortgage debt of the United States and of the several States. Schedules were sent to all owners of farms in 85 representative counties distributed over the country. This study will supplement the mortgage data from the agricultural census of 1925 by showing the debt on tenant-operated and manager-operated farms as of the census date. The inquiry will also indicate the mortgage debt on all classes of farms as of January 1, 1928. It is expected that the results of this study will be available before the end of the calendar year.

### FARM TAXATION

The main part of the work in farm taxation has been conducted in cooperation with a number of the State agricultural colleges, and the results have been prepared for joint publication. In Massachusetts study was devoted to the subject of assessment and the inequalities that have resulted from the present system. Trends of expenditure among the rural sections

of Massachusetts have also been studied. The Michigan study was devoted primarily to a comparison between the income and taxation of various classes of property and businesses in the State. Farm-taxation studies have been carried on in South Dakota, Colorado, and Virginia. The first phase of the study of the farm-tax situation in Virginia has been completed, and a report on the burden of taxation on real estate in that State is being prepared.

New studies of farm taxation in cooperation with State agencies were initiated during the year in New Jersey, Delaware, North Carolina, Iowa, and Washington. A feature of particular interest in connection with these studies is the fact that in Iowa and North Carolina the bureau is cooperating with groups set up by the State legislatures of each of these States to study the tax problem and to report needed adjustments in the State's system. Informal cooperation with several other similar groups has also been a feature of the year's work.

The compilation of a current index of farm taxation by States has been carried through the year 1927. This index is based on reports supplied by farmers on the crop-reporter lists and is checked with the regular reports of various State bodies and with special work that is being done in several of the States. A slight, but steady, increase in taxes paid by farmers for the past few years seems to be indicated by all available information.

#### AGRICULTURAL INSURANCE

A study of developments and problems in farmers' mutual fire insurance was completed during the year, and the results of this study were submitted for publication as a technical bulletin by the department. The study covers hazards insured against, terms for which policies are issued, relation of insurance to value of property, special problems involved in fire insurance on livestock, maximum risks accepted and reinsurance for larger risks, classification and inspection of property, methods and costs of getting business, methods of collecting such costs from the insured, reserves against unusual losses, standardization of forms and practices, and, finally, a summary of statistical data showing the relative importance or position attained and the underwriting experience of this class of companies in the various States.

Contributions on various farmers' insurance problems were made at the annual meetings of the National Association of Mutual Insurance Companies, the American Country Life Association, and the State associations of farmers' insurance companies of Iowa, Missouri, Kansas, Tennessee, and New York. Assistance and advice on special problems confronting individual farmers' mutual insurance companies were extended through personal interviews and through correspondence with officers of such companies.

Cooperation was continued with the committee on farm fire protection, which was organized in 1926 and is working under the auspices of the National Fire Protection Association. A brief bulletin prepared by this committee, entitled "Preventing Farm Fires," has been published and widely distributed by the association.

A study of the history and present status of livestock insurance in the United States was begun during the year, and some additional information has been gathered on insurance against hail and other hazards to farm crops, as well as on automobile insurance for farmers. The last-mentioned form of insurance on a mutual or cooperative plan has shown marked progress during 1928.

#### DIVISION OF COOPERATIVE MARKETING

CHRIS L. CHRISTENSEN, *in charge*

Greater progress in cooperative organization among farmers has been made during the last 10 years than during any other period in American agriculture. Not only have the number of associations, number of members, and volume of business increased rapidly but there has also been noticeable progress in the improvement of the legal status of cooperatives, in organization set-up, operating technic, and business efficiency.

From small beginnings but with constant progress, cooperative methods have now been applied to the marketing of all kinds of farm products and to the purchase and distribution of farm supplies. From a concept of cooperation which was little more than a realization of the economic need for changes in the marketing system, the movement has progressed until now there have been built up thousands of small local associations and hundreds of large cooperative marketing and purchasing associations owned and controlled by farmers. The de-



velopment of the large-scale marketing and purchasing associations is a significant feature of the cooperative movement in the last decade. There are now several farmers' agricultural cooperatives each of which sells annually farm products valued at \$50,000,000 or more, and more than 100 associations are in the \$1,000,000 group.

Cooperative marketing of agricultural products and purchasing of farm supplies has now reached the practical-business stage. Farmers generally have found in the cooperative form of business a method well adapted to their needs. The cooperative method is now being applied in the marketing of practically all farm products and in cooperative purchasing, credit, and other fields. This growth can be explained only by the fact that co-operation has rendered a distinct service to the farmers of this country.

The research, service, and educational work of the Division of Cooperative Marketing is based upon the needs of the expanding cooperative movement. Research projects are planned to assist farmers and their cooperative associations with problems of organization, management, financing, accounting and pooling methods, merchandizing, and membership relations. Educational and service work is also carried on in the marketing of agricultural products, cooperative purchasing of farm supplies, and other cooperative activities among farmers.

In the research, service, and educational work of the division it has been the aim (1) to assist in making existing associations more efficient as business units, (2) to assist through regional surveys of production and marketing practices in the organization and development of sound cooperative organizations, and (3) to disseminate correct information regarding the possibilities and limitations of the cooperative method of marketing farm products and purchasing farm supplies.

#### RESEARCH STUDIES

The research work of the division is directed along four major lines: (1) Study of the development of cooperative marketing associations within each major commodity group. (2) Business studies of individual cooperative associations which have been operating over a period of years. In these studies a detailed critical analy-

sis is made of the organization, membership relations, pooling and accounting methods, financing, management policies, and merchandising practices of individual associations, and of the external economic factors which affect their operations. (3) Research in legal phases of cooperative organization, financing of cooperatives, membership relations, and educational methods. (4) Studies of cooperative purchasing of farm supplies.

#### COOPERATIVE MARKETING OF GRAIN

The study of farmers' elevators in the spring-wheat area was continued in cooperation with the State colleges and experiment stations of Minnesota, North Dakota, South Dakota, and Montana. Much information concerning the organization methods and operating practices and problems was obtained from nearly 100 farmers' elevators located in this area. Preliminary reports were prepared and published, giving results of the analyses of costs of operation, the protein problem, hedging operations, and other phases of farmer-elevator operation.

A general survey of farmers' elevators in the entire United States was begun and information obtained from a large number of associations concerning their organization methods, operating practices, and financial conditions.

A study of cooperative grain marketing in Canada was completed during the current year. This study brought out the fact that 25 years ago grain producers of the United States and Canada had reached about the same stage of progress in the solution of their marketing problems. Since that time, however, there has been a pronounced difference in the developments that have taken place. The development of grain marketing in Canada has been from local cooperative elevators to cooperative commission companies, then to cooperative line-elevator companies, and finally to large-scale cooperative marketing associations (often referred to as wheat pools) which control country and terminal facilities, whereas in the United States the local farmers' elevator is still the dominant organization. Several explanations are offered for the difference in organization in countries where conditions of production and marketing are understood to be similar. Chief among these reasons are the following: The Canadian crop consists almost exclusively of one variety



of hard spring wheat, grown in a region where production and marketing practices are standardized; the bulk of the crop passes through one city and over one route to eastern and export markets; cooperative marketing experiences of Canadian producers for more than two decades formed a natural setting for the development and successful operation of the present large cooperative grain-marketing associations, whereas in the United States quite the opposite situation prevailed. Other factors which have contributed to the success of the Canadian associations are the fact that the bulk of the Canadian crop is exported; the importance of the wheat crop to the economic life of Canada, particularly the West; the existence of a banking system which facilitates large-scale cooperative activities; and the support of the provincial and Dominion Governments. Important as these and other factors have been, however, it is believed that the achievements of both cooperative elevator companies and the pools are due primarily to the fact that they have been organized in such a way as to coordinate the operation of country and terminal elevators with central selling agencies.

During the year a study was begun which, when completed, will bring together the facts concerning farmers' efforts in terminal grain marketing in this country. A preliminary survey of cooperative grain commission companies and of state-wide wheat-marketing associations or wheat pools was undertaken. This investigation will lay the foundation for a further program and will put both the department and the associations themselves in possession of basic information which is fundamental to an intelligent appreciation of our grain-marketing problems.

#### COOPERATIVE MARKETING OF DAIRY PRODUCTS

Data have been collected regarding the important types of cooperative fluid-milk marketing associations. This study includes a description and comparison of the organization set-up and operating methods of the various types of fluid-milk marketing associations and economic analyses of individual associations and the environment under which they operate. Special attention will be given to the equitableness of pooling methods and price plans and the effect of the latter in controlling seasonal variation in pro-

duction and the leveling out of periods of excessive and insufficient production.

A study which was begun at the request of 25 dairy cooperatives of New England on economic aspects of the marketing of milk and cream in New England has been completed. The results of the study emphasized the need of coordination in the New England milk industry in production, assembling, converting, shipping, and city distribution. Effective cooperative organization of producers, built upon a firm foundation of ably managed country plants, was recommended as a means of bringing about such coordination.

An economic study of the Lake Michigan west shore milk shed, with special reference to the cooperative marketing of fluid milk, cheese, and butter, has been started in cooperation with the University of Wisconsin.

Cooperative butter and cheese associations have been studied in order to set forth the more important causes for the development of cooperative manufacture and sale of these products. The study will attempt to show, so far as the information can be obtained, the economic conditions which have been responsible for the development of cooperative marketing of these products and to explain the types of organizations that are particularly well suited to production conditions in different parts of the country.

#### COOPERATIVE MARKETING OF LIVESTOCK

A study of the terminal livestock commission associations was completed and the findings were published. This study covered the organization, operation, services, management problems, and accomplishments of these cooperative agencies and presents a working program as an aid to the associations in planning for further growth and improved service.

Information is now being gathered for a bulletin which will present the organization, working system, and accomplishments of the local livestock shipping associations, together with such current problems as trucking and direct shipping. Especial attention will be given to the experiences of associations which are handling these problems successfully.

To further assist the associations in their educational and extension programs, a motion picture, Cooperative Marketing of Livestock, has been made, which shows in detail the operations of the local livestock-shipping

associations and the cooperative terminal agencies. A slide lecture, series 228, Cooperative Feeder Cattle and Lamb Pools, was also completed during the year in cooperation with the extension division of the department. This covers the operations of the livestock-purchasing pools which ship livestock direct from the range to the Corn-Belt feeder.

#### COOPERATIVE MARKETING OF WOOL

At the request of 30 cooperative associations marketing wool, a study of wool marketing in Australia, New Zealand, and other competing countries was undertaken by the division in March, 1927. The purpose of this study was to acquire information which could be applied to the cooperative marketing of wool in this country. The investigation involved a thorough survey and analysis of the practices and methods of wool marketing in the countries indicated, with special attention to the importance placed on wool types for production purposes, the shearing of the fleece and the manner in which it is handled, and the system of centralizing wool and its shipment to the large markets. The functions and operation of the various wool cooperatives in Australia and New Zealand and the Australian Wool Council were also analyzed. A striking similarity was found in the development of the sheep industry in several of these countries, in some respects, and it is believed that the fact of their uniform success in the production and marketing of high-quality wool has been largely because of the following: Development of breed types, or modification of existing breeds to meet local conditions as to feed, climate, and other factors; preparation of the wool for market in such a manner as to attract the largest possible number of buyers; improved methods of disposal of the clip; development of the cooperative marketing of wool; and governmental support of the sheep industry in that an active interest in this industry was shown by the Governments of all of the countries studied.

#### COOPERATIVE MARKETING OF COTTON

The division's work with the cotton cooperative associations has involved both research and service. Study is being made continuously of the organization structure and operating methods and practices in the coopera-

tive marketing of cotton for the purpose of assisting the organized producers in determining desirable and undesirable activities and in directing their work along sound lines.

Assistance has been given in the organization of a system of cooperative gins or local units by two or three associations. Interest in the cooperative-ginning field is still great, and considerable progress is being made. A general study of one-variety-community cotton production as practiced in the irrigated valleys of the Southwest was made with a view to properly advising the development of one-variety communities around cooperative gins.

Most of the cotton-marketing associations have operated for one year under a new membership contract, which differs radically in many respects from the old one. Plans are being completed for a cooperative cotton conference to be called by the division to consider future objectives and policies.

#### COOPERATIVE MARKETING OF HONEY

In order to determine possible outlets and demand for honey, particularly that produced by cooperative associations in the Intermountain States, a survey of market conditions is being made in certain large cities. A part of this project, with reference to market conditions surrounding New York State honey producers, is being carried out in cooperation with the New York State College of Agriculture.

A summary of the preliminary results of the survey of wholesale outlets for honey shows that the following are important factors in the marketing of this product: (1) The chief wholesale outlets for honey are the bottlers, the wholesale grocers, and the chain-store systems. (2) All dealers agree that because it is a luxury product, honey must be standardized and advertised before it will meet a ready demand. However, dealers who are honey specialists report a gradual increase in volume of sales. (3) Consumers have little knowledge of honey, and because the price is relatively higher than that of s.rups, jellies, jams, and sugar, they buy the latter. (4) Many styles and sizes of containers add to the cost to the consumer. The survey of retail stores serves to strengthen the general conclusions regarding the marketing of honey which were derived from the study of wholesale outlets.



Education of the public relative to the healthfulness and food value of honey offers one promising solution of the problem. The further development of cooperative marketing among beekeepers is probably necessary to meet effectively the marketing situation here indicated. There is also need for co-ordination of the activities of all co-operative associations, especially in matters of standardization and advertising.

#### COOPERATIVE-BUSINESS ANALYSIS

Increasing interest is being manifested in that phase of the research program which deals with detailed critical and intensive studies and analyses of the organization and operation of individual farm-cooperative associations. The studies include a complete survey and analysis of the business policies and practices of an association, its relations with its members and its customers, and the economic environment under which it operates. The division has been able by such studies to be of special assistance to particular associations and to bring together facts relating to the standards of efficiency of all cooperatives.

An economic study of the organization known as the Poultry Producers of Central California was begun late in 1926, at the request of the board of directors of that association. The study involved a thorough examination of the marketing machinery of the association including legal structure, economic organization and operating practices, management, selling program, policies and efficiency with regard to costs of selling, membership relations, and other phases of the business. It was found necessary to include also a very complete analysis of the New York egg market and of the interdependence of this and other large markets for eggs. From the results of this study, a report was prepared for the board of directors of the association, an address was made before a conference of representatives of cooperative egg associations in Chicago, and the results of general interest have been presented for publication.

Some of the most interesting of the findings developed during the study may be summarized as follows:

The association has enjoyed an almost continuous growth in membership and in deliveries by members.

Deliveries seemed to be affected more by production cycles than by relative price changes. There has been a tendency to attempt to shift production so as to take advantage of the high prices attained in

the eastern markets in the late fall. This has resulted apparently in a heavier production of pullet eggs at that time of the year than might otherwise have been the case.

Membership appears to be divided into two classes: (1) Those whose business is largely, if not wholly, the production of poultry products; (2) those to whom poultry production is a side line. The latter group comprises about 58 per cent of the membership and delivers about 76 per cent of the volume.

A survey of the membership indicated a wide general satisfaction with the association and its policies, concerning which the members seemed to be well informed.

The selling policy of the association is to market in the East all eggs of the characteristics which enable them to stand the shipment east. The balance of the production, amounting to somewhere around 45 per cent of the total, is marketed in the local produce area, largely in San Francisco and other cities on the bay.

A business study of the Producers Live Stock Commission Association of National Stock Yards (East St. Louis), Ill., was completed during the year. This association is one of the 25 co-operative livestock marketing agencies operating on the terminal markets. This project was undertaken at the request of the board of directors of the association because it afforded the division an opportunity to study analytically one of the larger terminal livestock marketing associations. The study included an analysis of the organization set-up of the association and of the financial results of its operation. Membership problems were also studied. In this connection the consistency with which members and others had consigned shipments of livestock to the association from year to year was determined. Numerous interviews were had with member and nonmember shippers of the association and others in order to determine their attitude toward the association and its operation. The price and sales policies of the association were analyzed statistically.

Upon completion of the study a report was prepared and submitted to the board of directors of the association. One of the results of this study was the presentation to the board of directors of the National Live Stock Producers Association, at their request, of a suggested program of research for the national association.

At the request of its board of directors, a business analysis of the Rice Growers Association of California was undertaken, which will embrace the problems involved in the marketing of the rough and milled rice of the United States, and in particular the methods followed by the association

in disposing of members' rough rice to domestic buyers and in disposing of the crop surplus as brown or milled rice in foreign markets, principally Japan.

Japan rice is the only class grown commercially in the principal rice area of California, and this is a class of rice acceptable in Japanese export trade. Ample control of the supply of rough rice assisted the association materially to secure contracts with all the milling interests for toll-milling rough rice into brown rice, which was sold to Japan. Through the contract with the millers the association was able to obtain the cooperation of non-member supplies. The export operations cared for the surplus from the large 1926-27 crop, leaving no carry-over into the 1927-28 marketing period, and the domestic price was thereby enhanced. Marketing of the surplus of the 1927-28 crop, however, was materially inhibited because of the large rice crop in Japan, which was accompanied by relatively lower prices in that country, and because of the condition of the California crop, a large portion of which was damaged from early fall rains which occurred during the 1927 harvesting period.

In its usual selling operations the association does not pool the sales returns of its members but permits the members to choose the date and approve the price at which the association sells rough rice. The management of the association, through efficient grading service, current news letters to individual members, marketing credit arrangements, and efficient field departments, has succeeded in maintaining orderly marketing of the members' rough rice. The preliminary results of this study are being used by the division to assist rice farmers through their cooperative associations.

At the request of a group of organizations and agricultural leaders in Virginia, North Carolina, and South Carolina, a study was undertaken to determine the cause of the failure of the Tri-State Tobacco Growers' Cooperative Association, with a view to obtaining facts that will be of use to other tobacco cooperatives in avoiding similar misfortunes and in directing their business operations. Information on tobacco marketing and price data were obtained also from representatives of tobacco warehouses over the three States, and visits were made to about 1,000 farmer-producers.

The study, as it progressed, brought out three major aspects of the situa-

tion with respect to the cooperative marketing of tobacco in North Carolina, South Carolina, and Virginia: (1) Unfavorable social conditions and low standards of living among the tobacco producers; (2) the economic conditions surrounding the tobacco growers, particularly the fact that the majority of farmers are heavily in debt and that most of the tobacco is grown on borrowed capital; and (3) the inherent characteristics of tobacco production and marketing. Certain factors within the association, such as their failure to employ a full-time executive, extravagant expenditures, price and sales policy, and redrying policy, contributed to the failure of this particular association rather than the real obstacles to the permanent development of the cooperative marketing of tobacco.

Circular No. 10, entitled "Joint Use of a Sales Organization by Two Cooperative Associations," based on the study of the joint-sales arrangement whereby the deciduous fruit of the California Fruit Exchange is sold through the sales organization of the California Fruit Growers Exchange, was completed and published.

#### MEMBERSHIP RELATIONS AND FIELD SERVICE PROBLEMS

To obtain information on which to build more effective field service and educational programs through study of the membership problems of cooperative marketing associations, a series of surveys of membership relations was begun in 1925 with the study of certain large tobacco and cotton cooperative associations. This project was continued in 1926-27 by the study of the membership problems of four large fluid-milk cooperative marketing associations, in cooperation with the Ohio State University and Cornell University. A preliminary report of this study was made to the associations. On the basis of this report the extension force of the department of rural economics at Ohio State University, together with the officers of the association and the representatives of the Division of Cooperative Marketing, formulated somewhat in detail an educational program for Ohio cooperatives which they have executed in cooperation with the field-service departments of the two cooperatives. Similar preliminary reports were made to the Philadelphia and New York milk cooperatives, and the division has assisted these two large coopera-



tives in formulating in detail an educational program for the 25,000 members of the Philadelphia association and the 45,000 members of the New York Dairymen's League.

Other surveys of this series have been made in connection with the local livestock-shipping associations of Illinois and Missouri. Surveys among the prune and apricot growers' organization of California and the Pacific Co-operative Wool Growers' Association were conducted during 1928. It is planned to cover all of the representative branches of cooperative marketing in these studies and to combine the conclusions reached in a general bulletin on membership relations and field-service problems of cooperatives.

#### LEGAL PHASES OF COOPERATION

The study of legislation, court decisions, and interpretations affecting cooperation has been continued during the current year, and articles relating to these matters have been prepared and published in *Agricultural Cooperation*, the biweekly periodical published by the division. The division has been represented by its legal specialists in a number of important conferences where assistance was rendered in the solution of the legal problems confronting cooperative associations. A large number of inquiries concerning the organization of cooperative associations and their legal problems have been answered.

#### FARMERS' COOPERATIVE OIL ASSOCIATIONS

The study of farmers' cooperative oil associations, in cooperation with the University of Minnesota, was extended to include recent developments of cooperative purchasing in that field. Attention was given to the organization, financing, management, and costs of operation of these companies. The results of the extended study are now in process of publication which will make available the experience of these associations for the benefit of groups who plan to organize such cooperatives and for purposes of comparison with other associations already established.

#### SERVICE AND ADVISORY ACTIVITIES

There is an increasing demand from cooperatives for service and advisory assistance. The staff is constantly being called upon to assist existing cooperative associations with their legal, financing, and merchandising problems, accounting and pooling prac-

tices and to assist and advise committees, and producers who contemplate organization.

The assistance which has been given the American Rice Growers' Association illustrates the type of service which has been rendered to scores of large cooperatives during the past year. Features of this particular project, which deals with the reorganization of the association, include the installation of a rough-rice grading laboratory at Beaumont to provide Federal-State grading service on the basis of the United States standards, market news service to members and exchange sales managers, and standardization of trade practices between localities.

Other examples are (1) the preparation and presentation of a plan for the federation of apple marketing associations in the Nashoba section of Massachusetts; (2) a survey of marketing conditions and the development of a plan of organization for beekeepers in the five Intermountain States—Idaho, Utah, Montana, Wyoming, and Colorado (the Mountain States Honey Producers' Association has been formed in accordance with the findings developed in this survey); (3) the preparation of contracts and assistance in grades and classification for the "feeder pools" of terminal livestock marketing associations (under this cooperative endeavor cattle and lambs are shipped direct from the range to the feed lots in the Middle West); (4) the preparation of a standard set of by-laws for farmers' elevators at the request of a number of farmers' elevators in the spring wheat area.

#### EDUCATION AND EXTENSION IN COOPERATIVE MARKETING

Short-time schools of cooperative marketing in which the division cooperated were held during 1927-28 in Connecticut, Colorado, Arkansas, Tennessee, Kansas, Missouri, Texas, and Massachusetts. These schools are conducted by State colleges of agriculture and extension services and have elicited the active support of the cooperative associations within the States where they have been held. The average attendance at each of these schools has been approximately 150 persons. Those in attendance have been chiefly directors, officials and field men of associations, county agents, agricultural teachers, and others who have responsibility with regard to the direction of the cooperative movement within their respective States. The programs are designed to

present a general picture of national cooperative development, policies, and problems, but more particularly to give consideration to the needs of the associations and the general marketing problems within the area represented in each school.

The division has also cooperated with the State Board of Vocational Education and the Extension Service in Colorado in conducting a series of 10-day schools or cooperative marketing conferences for farm people. It is the purpose of the division to make the results of its research work and other published material available to teachers in such form as will be most useful to them, not only in conducting schools for farmers and farm boys, but also in strengthening the work in agricultural cooperation which is being given in high schools.

Representatives of the division have taken part in many meetings of cooperative associations, and other meetings of farmers. Much time and assistance have been given in the formulation of State programs for the extension of cooperative marketing among producers. In this work use is made of film strips, lantern-slide lectures, motion-picture films, and exhibits. A series of lessons in cooperative marketing was prepared for broadcasting through the United States radio farm school. Approximately 100 State and national meetings, cooperative-marketing schools, and other important meetings were addressed by representatives of the division.

The results of all studies made are prepared for official publication, either as mimeographed reports or printed bulletins. In addition many special articles and releases are prepared for magazines and other periodicals.

#### HISTORY AND STATISTICS OF COOPERATION

A count shows that the number of participants in the activities of cooperative associations at the close of 1927 was about 3,000,000. Although some farmers participated in the activities of more than one association, it is estimated that more than 2,000,000 farmers were served by cooperatives during the year.

Technical Bulletin No. 40, entitled, "Agricultural Cooperative Associations, Marketing and Purchasing, 1925," was published during 1928 and is being widely distributed for use as a text in schools and colleges of agriculture and in special courses in agri-

culture and marketing. The bulletin is also being used for reference purposes by bankers, economists, public speakers, and magazine writers and by students, teachers, and public officials in foreign countries. This publication was based on detailed information regarding the 11,400 farmers' business-association records which are on file in the division's library on cooperation, and it contains the most complete statistical and historical information available on the farmers' cooperative movement in the United States. A number of other statistical and historical reports were issued also.

The biweekly circular, *Agricultural Cooperation*, was continued. This publication contained articles covering statistical and other information on cooperative marketing of cotton, fruits and vegetables, dairy products, grain, livestock, nuts, poultry products, and wool, and on cooperative buying and education in cooperation.

#### DIVISION OF FARM POPULATION AND RURAL LIFE

C. J. GALPIN, *in charge*

Popular interest in farm-population statistics has risen. The continued heavy movement of farm people to cities, accompanied by an increased return movement from cities to farms, has raised several new questions such as the following: Does prosperity for agriculture require a considerable diminution in the present farm population; can cities absorb without distress to farm migrant and city laborer the excess farm population; may it not be necessary for agriculture to retain a lower stratum of farm population of considerable numbers, living on poor lands and restricted to a relatively low standard of living; and is evacuation of poor lands and resettling of farm people on good land feasible?

Work is being done on analyzing the distribution of farm population over land of varying quality in an effort to determine the relation between quality of land, size of farm, etc., and the family standard of living. It appears from preliminary study that a large percentage of the farm population lives on land that is too poor or farms which are too small to make possible a satisfactory standard of living. It is expected that results of the study can be published in the comparatively near future.



## RESEARCH STUDIES IN PROGRESS

The sum of \$97,038 of Purnell Act funds has been allocated to sociological research at the agricultural experiment stations of 23 States for the fiscal year just ending. The Division of Farm Population and Rural Life has cooperated in one form or another in virtually all of these research projects. Ten studies were completed and bulletins published by the cooperating agencies. The field work on 14 other studies has been completed or is nearing completion.

In cooperation with the Ohio experiment station and the Division of Farm Management a study was made for the purpose of determining the conditions of farming and of family living in a region of low incomes and low expenditures. It was found that only three out of five of the farms in this area a generation ago are now being operated. Many who now live on farms find part-time employment in the coal mines, work on State and county roads, at oil fields, or in saw-mills. Some of the farm homes are now used entirely as a place to live. It was found in this area that after the expenses of operating the farm were paid only about 40 per cent of the average amount of cash available for the family living expenses came from the farm. On the other hand, some of the highest incomes were made by farmers operating farms which had a sufficient acreage of really tillable land and devoting all of their time to farming.

In cooperation with the Division of Cooperative Marketing a research study of the social factors involved in the cooperative potato exchanges on the Eastern Shore of Maryland and Delaware has been nearly completed. It has been found that the social factors are as important to the successful operation of a cooperative association as the physical and economic conditions.

A nation-wide study of rural community buildings, with special reference to buildings built and utilized by cooperative organizations is under way. A study of rural libraries was completed, and the results were published as a farmers' bulletin.

The division has given assistance and supervision to a survey of the active research projects in the field of rural sociology. This survey has

resulted in a valuable monograph of a descriptive and critical character of the work of rural sociological research in the United States.

The usual directory of persons teaching rural sociology in colleges and universities of the United States was issued. The quarterly publication entitled "Farm Population and Rural Life Activities," which is a review of current research and related projects, has proved to be of great value to sociologists. Resolutions were adopted by the rural sociological section of the Sociological Society expressing appreciation of the work of this division and recommending the continuance of the quarterly.

## ECONOMICS LIBRARY

MARY G. LACY, *in charge*

The library continued to meet the requests of the public for information on subjects pertaining to agricultural economics, as well as to furnish assistance to the research workers of the bureau and others both in the Government service and outside who are working on economic problems relating to agriculture.

In addition to the circulation of a large number of books and periodicals the library circulates and files current reports covering crop and market conditions. Special files are maintained of information coming from foreign fields. A large volume of correspondence is handled which necessitates reference and research work.

A special feature of the library's work is the preparation of a series of bibliographies on agricultural economics. The series was begun several years ago, and, during the past year, 12 mimeographed bibliographies were issued, besides 35 typewritten reference lists. In addition to serving the needs of the workers in this bureau, these bibliographies are much in demand by agricultural workers throughout the United States and in foreign countries. Many commendations are on file which indicate a growing appreciation of this type of service.

Agricultural Economics Literature, a monthly publication which reviews current books and articles on subjects relating to agricultural economics, has been published throughout the year. Many testimonials as to its usefulness and requests to be placed on the mailing list for it have been received.

## DIVISION OF LAND ECONOMICS

L. C. GRAY, *in charge*

### LAND RESOURCES AND LAND UTILIZATION

Crop acreage in the United States has remained practically stationary for a decade, the number of horses and mules has decreased 25 per cent, the number of cattle has decreased over 20 per cent, and the farm population has decreased fully 10 per cent. Nevertheless, the increase in agricultural production since the World War has been much greater than the increase in the Nation's population. Is this increasing efficiency in the utilization of the land likely to continue, and will there be no need for more crop land in the near future? The answer to this question is basic to programs of land reclamation and settlement, and to the forest policy of the United States and of several States.

The two major causes of this increased efficiency in land utilization are (1) the substitution of automobiles and tractors for horses and mules, with the resultant release of a large amount of feed for meat and milk animals, and (2) the increasing production of milk and pork per unit of feed consumed. A study of the factors involved in the great increase in animal products per acre of land utilized, both for the United States as a whole and in each of the agricultural regions, together with the shifts in production that have occurred from region to region has been completed.

Another study dealing with regional shifts in crop acreage and in acre yields and the resultant effect on crop production in the United States as a whole is nearly finished. A third study dealing with the changes in agricultural production and consumption in the United States as a whole since 1900 and the consequent changes in land utilization is under way.

An article entitled, "Land-Use Changes Point to Lessening Need of Expansion" was published in the Yearbook, and a summary paper, *Population, Food Supply, and American Agriculture* was issued; also a study of land utilization in China was published in the journal, *Foreign Affairs*. The soil section of the *Atlas of American Agriculture*, prepared primarily by the Bureau of Chemistry and Soils but with the aid of this division and under its general direction, is nearly ready for publication. Land-classification maps of the central Great Plains,

prepared by the United States Geological Survey, Department of the Interior, for the *Atlas of the Great Plains*, under preparation by the Division of Land Economics, have been completed; and a natural-vegetation and carrying-capacity map of the northern Great Plains is practically finished, as are also a series of maps showing land utilization in the northern Plains by census-enumeration districts. The compilation of data obtained by surveys in the southern Great Plains on settler's progress and land utilization was also completed.

### REGIONAL PLANNING STUDIES

This division is cooperating with the West Virginia, Pennsylvania, and Kentucky Agricultural Experiment Stations in studies looking toward the development of more satisfactory land utilization in the mountainous regions of those States. During the past year work has been continued in Colorado and West Virginia and initiated in Pennsylvania and Kentucky.

The fundamental problem consists largely of determining which areas should be in forests and which in farms. The next step involves the determination of what combination of timber growing and farming within the same general area is most economic, and, third, the determination of the most economic combination of crops and timber growing on specified types of farms.

Regional studies in rural planning are intended to provide the basic material prerequisite for the development of agricultural extension programs. In these mountainous regions, particularly in the Appalachians, a transition almost revolutionary is taking place with reference to the use of lands. Many farms are being abandoned, and many farmers are moving into other farming areas or into industry. When the results of the studies in regional planning are available to the extension workers they will be able to give such advice as will eliminate a great deal of the friction incident to the transitional processes and at the same time bring the transition about more quickly.

Results of a regional-planning study in the region of western Colorado affected by the completion of the Moffat Tunnel are being analyzed. In that semiarid region the problem is to ascertain the margin between farming and range grazing, to study the problems of coordinating the two uses, par-



ticularly the problems growing out of the interspersal of large areas of public range land and forest reserves.

#### LAND-SETTLEMENT STUDIES

In cooperation with the experiment stations of Minnesota, Wisconsin, and Michigan and with the Wisconsin Department of Agriculture, a survey is being made to determine the turnover of settlers in various types of land-settlement projects in the cut-over portions of those States. This is a follow-up study based on a survey of conditions of land settlement in the same area made seven years ago. Attention is being given to the progress in clearing land and in net worth of settlers who are still on these farms. A bulletin designed to aid prospective settlers by describing vacant areas in the United States available for settlement is being revised. A manuscript has been prepared summarizing the results of studies of factors affecting the progress of settlers in the same territory, and another manuscript designed to be published as a farmers' bulletin descriptive of the opportunities for settlement and the problems confronting settlers in the northern Great Lakes region has been nearly completed.

#### LAND APPRAISAL AND LAND VALUES

The unprecedented declines in farm real estate values during the last seven years have emphasized a phase of our agricultural problem to which formerly little attention was given. The resultant huge losses to individual farmers, to private investors, to the country banks, and to the larger lending institutions of the country, together with the fact that the end of the decline does not even yet appear to have been fully reached, has awakened the country to the importance of having better information on the underlying trends in the farm real-estate market. Accordingly, a principal objective during the year has been to enlarge and improve the annual survey of conditions. More than 20,000 copies of the report of the second survey entitled, "The Farm Real Estate Situation, 1926-27" were distributed. During the same period the number of dealers, bankers, appraisers, and others voluntarily co-operating in reporting on conditions was doubled.

The bureau participated in two land-valuation short courses conducted under the auspices of State agricultural experiment stations. Prelimi-

nary investigations of the availability and adequacy of data compiled by official agencies outside of the Federal Government were made. Two of the States leading in the compiling of actual farm-sales prices as a basis for the equalization of assessments, have virtually abandoned the use of actual sales for this purpose because of the impossibility under prevailing conditions of obtaining enough voluntary sales with which to work. Reliance is being placed upon competent estimates of value, the method which has always been the basis of this bureau's figures. Further advance was made during the year in the preparation of an annual index, which will indicate the extent to which farm real estate values are tending to get "out of line" with their realized earnings and with the rates of return procurable on alternative investments.

Substantial progress was made on studies of various local factors influencing farm real-estate values being carried on in cooperation with the Bureau of Public Roads. Determination of the net effect upon value of buildings, soils, roads, etc., should aid in the development of improved land-appraisal methods and throw light upon the problem of rural-highway finance. Studies of the only available long-time records of land prices—those found in the county deed books—were continued in an effort to ascertain the major movements in farm real-estate prices and the factors which will explain them. A cooperative study with the Minnesota Agricultural Experiment Station of the effect of various local factors on land values in the cut-over counties of the three Lakes States was carried to substantial completion.

#### LAND TENURE

The study of land tenure in its relation to land utilization in Georgia was expanded to include a section of South Carolina and a few counties in Alabama and North Carolina. The combination of unfavorable economic conditions for cotton production in this area and bad crop seasons has placed the land owners in a position in which it is impossible to operate on the old basis. Work in cooperation with the Kentucky Agricultural Experiment Station on farm-business surveys has been continued.

The study of land tenure in Nevada has been continued in an effort to reach the solution of the problems

involved. The large area of public domain, used mainly as low-grade grazing land, raises many questions as to proper methods of control, kinds of use that will make the best returns, the maintenance of yield of the natural vegetation, etc. These questions concern privately owned lands also that must be correlated with these public lands. Maps showing the present ownership, utilization, and control of the land are being prepared. The local points of view have been obtained by interviewing a large number of ranchers. A study of the development of the laws and judicial decisions related to this subject has been carried on with a view to finding out the kinds of rights which have been recognized and the local methods of control which have been established.

#### FARM LABOR

A questionnaire was circulated to all parts of the country requesting data as to the amounts of money paid in each month of 1927 to farm labor hired both by the month and by the day, both with and without board. The objects were to obtain more definite information concerning the relative amounts paid monthly and annually to the various classes of labor by the different methods and by the various types of farmers; also to secure a check upon the accuracy of certain farm wage data calculations made in the bureau. Tabulation of these data is largely completed, and the results of the inquiries of the two previous years concerning the perquisites of non-casual and casual farm laborers will soon be available.

Other studies to be reported upon include the agencies of distribution of farm labor in 12 Northeastern States, the farm-labor supply and demand, farmers' methods of handling labor, and the general farm-labor conditions in those States. A statistical tabulation is being made to show the portion of population engaged in agriculture and as farm laborers; also the relation between the population engaged in agriculture and the value of farm property by counties, and the expenditures for farm labor and the part of production which goes to meet farm-labor expenses.

#### DIVISION OF ECONOMIC INFORMATION

J. CLYDE MARQUIS, *in charge*

The growth in the use of economic facts in agriculture continues. The

results of the bureau's work of spreading information is shown by a steady increase in the number of individual farmers and business men dealing with agriculture who wish to keep informed on changes in agriculture. The growth in demand has been supplied chiefly through contacts with extension agencies, principally the county agents, and other extension specialists. Economic facts are becoming a larger part of the materials used in general farmers' meetings so the change is not reflected entirely by the demands for bulletins.

During the year just completed the contacts between the division and the extension groups have been increased. The head of the division has presented the bureau's work to groups in several States, and conferences of economists, extension directors, marketing officials, agricultural teachers, etc., have been assisted.

The most comprehensive research study of the bureau is the outlook program. The past year has seen the greatest advance in this field since it was started six years ago. By means of the outlook conference in Washington, representatives of over 20 States were informed upon what facts the bureau could provide regarding the general agricultural situation. The State outlook conferences that followed then gave additional distribution to the facts, and the general publicity has stimulated a widespread interest in the bureau's work throughout the country. The preparation of the outlook report, its distribution to the press, to extension workers and farmers, the handling of charts, introduced as an aid this year for the first time, all have added to the work of the Division of Economic Information. The outlook report of 1928 received the greatest distribution of any single report of the bureau at any time.

The efforts to codify the facts of agriculture into a practical chain of publications have been continued. Daily, weekly, monthly, and annual publications have been arranged more nearly to fit together to make a complete series that is readily understood and used. First steps have been made toward the development of a more complete series of elementary economic circulars bearing upon each farm product.

#### SERVICE TO THE PRESS

Approximately 300 press releases covering the research and regulatory



work of the bureau were prepared and distributed during the past year. These releases dealt largely with the bureau's activities in farm-management research, cooperative marketing, shipping-point inspection, market news, standardization and grading, and economic research in land economics, farm finance, and rural sociology. They were distributed to farm journals, daily and weekly newspapers, press associations, trade journals, and other publications interested in agricultural economics.

Requests from farmers and educators in agricultural economics indicate that the bureau's press activities have been the means of stimulating the demand for economic information by farmers in the adjustment of farm production to market needs.

There is constant call for information additional to that contained in the bureau's press material, and much time is required to furnish this information to special writers and others who need details. Much assistance has been given to periodicals in the preparation of market columns and pages presenting an official picture of national agricultural market conditions.

Press statements are issued monthly on the current agricultural situation, agricultural prices and indices, the cold-storage holdings of farm products, and on several other of the regular reports of the bureau. These releases have enjoyed an unusually wide popularity and are published regularly by several hundred newspapers throughout the United States. One press association alone distributes the release on the agricultural situation to more than 1,400 publications. Special signed articles are prepared, and a service is maintained whereby publishers and agricultural writers may obtain photographs which illustrate the bureau's work.

#### RADIO MARKET NEWS SERVICE

The distribution of market news by radio broadcasting has been further developed and strengthened and a better organization of the work effected. There has been a development of contacts with additional stations indirectly through the press associations and commercial news agencies. At Los Angeles a program of market reports was furnished by the Los Angeles branch offices to Station KFI. Improved arrangements with the stations KYW and KDKA have effected new programs of reports at Chicago and

Pittsburgh. A large commercial organization cooperating with the bureau in the distribution of market reports improved the service at Atlanta and Memphis and set up a new program at Kansas City.

New livestock market reporting offices were opened at Buffalo, Cleveland, Indianapolis, Cincinnati, and St. Joseph. Market news broadcasting was greatly improved by the establishment of regular programs at each place. At St. Joseph, Mo., the radio station installed a microphone in our livestock branch office so that prompt release of the market reports could be provided.

The establishment of a bureau of markets in Tennessee increased the interest in market news, and a good program of reports at Nashville resulted. There have been decided improvements in the program at stations at Denver, Minneapolis, St. Louis, and Rochester.

Improved broadcasting from Philadelphia radio stations enabled the Delaware Bureau of Markets to give the growers mail and telephone reports more efficiently.

A special economic program was carried on over the station at Denver in cooperation with the Colorado extension service. Talks by specialists in Washington were telegraphed to Denver for Friday release. This service has met with wide approval in the intermountain country.

A series of 30 economic talks, prepared as our contribution to the radio farm-school program of the department, covered the business of farming, marketing, and cooperative marketing. The 10 lectures under each subject were later printed as circulars.

#### PERMANENT PUBLICATIONS

The bureau provided a larger share of the annual Yearbook material than last year. The output in the regular department series was about the same as last year—a total of 54 printed bulletins, circulars, and service announcements. Nearly 100 special mimeographed reports, speeches, and articles have been issued. The volume of special articles, reports, etc., has increased somewhat, and the editorial work done for various offices has made a substantial growth. The size of Crops and Markets has grown somewhat, and further expansion is needed to print the growing volume of statistics gathered by the bureau, such as the new cotton staple estimates.

## ECONOMICS EXHIBITS

The contribution of the bureau to the exhibits program of the department during the past year has been large. The special display at the World's Poultry Congress, Ottawa, Canada, July, 1927, contained elaborate presentations of the marketing of poultry and eggs. These exhibits have been used extensively since in connection with State and local fairs. At the National Dairy Exposition held at Memphis, Tenn., the bureau provided 5 out of a total of 10 units displayed by the department. At the Chemical Industries Exhibition in New York City the bureau showed an exhibit on the utilization of cottonseed and cottonseed products, including the standards for cotton linters. This exhibit has been asked for by the National Cotton Exhibition at Memphis in 1928. At the Dairy Industries Exhibit in Cleveland, Ohio, the bureau contributed 4 out of the total of 8 units displayed.

At the International Livestock Exposition in Chicago, December, 1927, the bureau contributed 3 units, on the outlook work, the livestock market news, and the beef grades. After the international closed, the outlook booth and a special booth on cooperative marketing of livestock were shown at the Farm Bureau Federation Exposition in Chicago.

In addition to these showings the bureau exhibit material in the general department State fair program formed a considerable part of that program, which includes showing at 60 State fairs and other expositions, served by the department's exhibit service.

The small portofolio type of exhibit has been developed extensively during the year. These portfolios consist of 5, 6, or 7 panels, 16 by 30 inches. The panels carry illustrative material and legends and are found useful to bureau specialists in discussing phases of bureau work with small groups of people

and for display at meetings. They can be easily sent by parcel post. Portfolios have been made up on co-operative marketing, hay inspection, grain inspection, bulk-handling of grain, beef grades, egg standards, marketing potatoes, rural hospitals, rural libraries, etc.

Numerous requests for exhibit material have been received from State colleges, State bureaus of markets, county agents, and cooperative marketing associations, and in every instance some material has been forwarded; portfolios, easel panels, and standard three-panel exhibit booth together with models of dairy farms, chicken houses, and community club houses have been furnished.

## MOTION PICTURES AND FILM SLIDES

The program of motion pictures for the bureau during the last year included two pictures, *What's Ahead*, dealing with outlook work, and *Co-operative Marketing of Livestock*. Another picture was practically finished relating to the combine harvesting of grain. One other picture was partly photographed relating to the master farmer movement in Oklahoma. Film slides on several subjects were made, and plans were made for a general use of this method of presentation, which is rapidly replacing the old method of glass lantern slide.

## PHOTOGRAPHIC LABORATORY

The use of photography as an aid in the bureau's work is increasing. This process is quick and economical with many types of work. The new rotaprint process has proved to be a time and money saver in reproducing drawings, tables, and other designs quickly in moderate numbers. A new laboratory was equipped during the year, and over 350 rotaprint stencils were turned out. The laboratory has also done a large amount of color work for exhibits, etc., which has included color by oil paints and by water color.